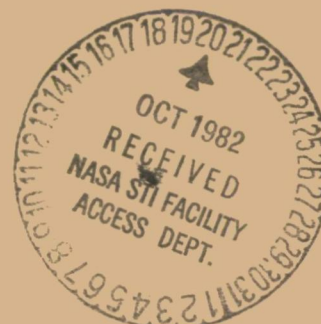




Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(236)
September 1982

National Aeronautics and
Space Administration



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AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 236)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in August 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*



Scientific and Technical Information Branch

1982

National Aeronautics and Space Administration

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 207 reports, articles and other documents announced during August 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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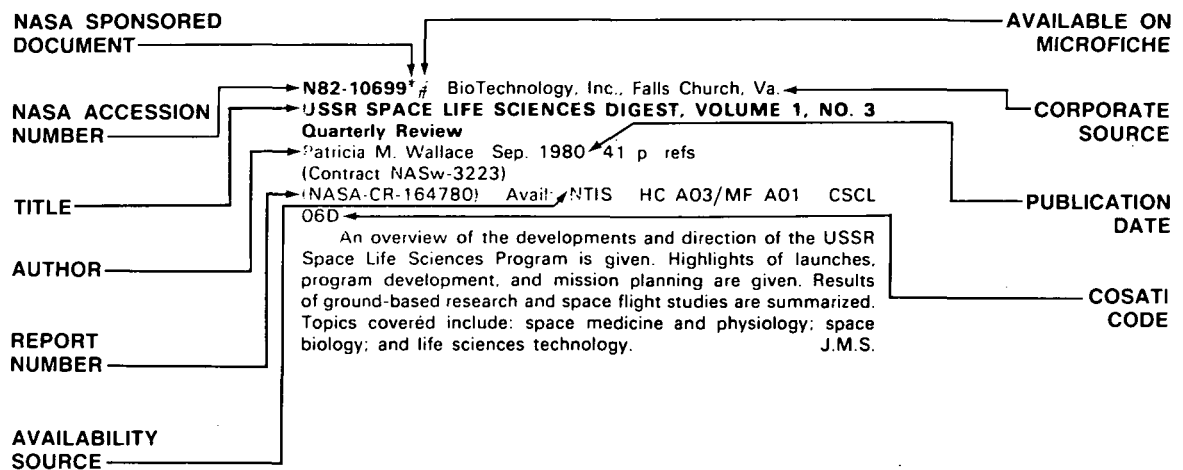
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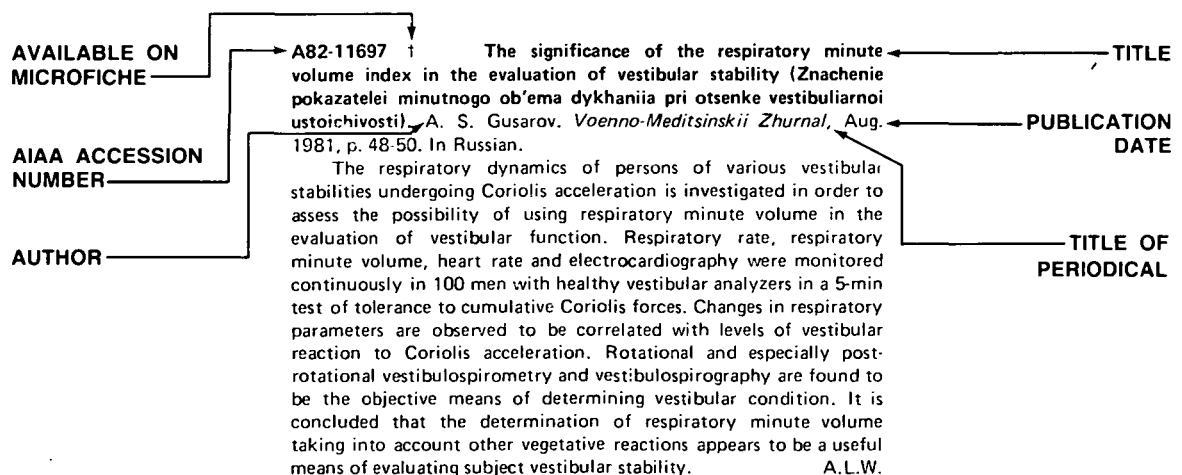
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 236)

SEPTEMBER 1982

IAA ENTRIES

A82-31830 The effects of social isolation on human functioning (Wpływ izolacji społecznej na funkcjonowanie człowieka). J. Terelak and K. Kwarecki (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland). *Postępy Astronautyki*, vol. 14, no. 1-2, 1981, p. 57-68. 21 refs. In Polish.

Studies relating to the effects of social isolation on the psychological, physiological and psychophysiological functioning of man are reviewed in light of the importance of such studies for space psychology. The relation between social isolation and sensory deprivation is discussed, and the importance of sensory stimulation to human functioning is pointed out. Problems arising from social isolation in polar stations are then examined, and means for improving adaptation to isolation are considered. Finally, empirical data and the concept of individual temperament are used to develop a mechanism for the effects of social isolation. A.L.W.

A82-31831 Central nervous system reactivity in the image of the visual evoked potential and the perceptual-motor performance of pilots and cosmonaut candidates under conditions of sleep deprivation (Reaktywność ośrodkowego układu nerwowego w obrazie wzrokowego potencjału wywołanego wprawnośc percepcyjno-motoryczną pilotów i kandydatów na kosmonautów w warunkach deprywacji snu). W. Zuzewicz and J. Maciejczyk (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland). *Postępy Astronautyki*, vol. 14, no. 1-2, 1981, p. 69-85. 28 refs. In Polish.

The effects of sleep deprivation on the visual evoked potential and psychomotor and perceptual performance are studied in pilots deprived of sleep for 52 hours. Electroencephalograph recordings show sleep deprivation to be accompanied by increase in the amplitude of the components of the evoked potential, as well as increases in latency time and in the duration of the late components. Sleep deprivation is also found to decrease visual-motor coordination, although it improves short-term attention. A correlation is found between visual evoked potential parameters on the one hand and visual-motor coordination and attention on the other under conditions of rest, however after sleep deprivation the dependence only involves attention. A.L.W.

A82-31832 Hemodynamic response during combined tilt table-isometric exercise test and +Gz acceleration tolerance. W. Kowalski (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland). *Postępy Astronautyki*, vol. 14, no. 1-2, 1981, p. 87-95. 11 refs.

The use of isometric exercises in combination with the tilt-table test as a predictor of human acceleration tolerances is investigated. Threshold acceleration tolerances were determined on a human centrifuge for 20 healthy pilots aged 21-23 years, and compared with measurements of heart rate and blood pressure performed during a tilt-table test in which subjects performed 50% maximal force static hand-grip exercise in the last 2 min of the 10 min rest period in the horizontal position prior to tilting. Pre-tilt heart rates are found to be lower and blood pressures higher in those subjects showing an above-average acceleration tolerance than in those with below-average tolerance. Isometric exercise during the tilt-table test evokes significant hemodynamic responses, including increases in heart rate,

blood pressure and the pressure-time index, which are significantly more pronounced in subjects with lower acceleration tolerances.

A.L.W.

A82-31837 Problems of human biology in Polish polar research. K. Kwarecki and J. Terelak (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland). *Postępy Astronautyki*, vol. 14, no. 3, 1981, p. 35-49. 13 refs.

Various aspects of the biomedical part of the Polish polar research program are reviewed. Attention is given to selected physiological functions of human beings in regard to location and duration of stay in polar conditions; basic human biorhythms; psychosocial phenomena during isolation, health standards and criteria for the recruitment of candidates; and rules of prophylactic and medical treatment. B.J.

A82-32001 An analysis of the risk of human cardiac damage during +Gz stress - A review. M. H. Laughlin (Oral Roberts University, Tulsa, OK). *Aviation, Space, and Environmental Medicine*, vol. 53, May 1982, p. 423-431. 96 refs.

Minor cardiac damage represented by subendocardial hemorrhage, myofibrillar degeneration and myocardial necrosis has been observed in miniature swine following acute +Gz exposure. The present paper reviews the available information on the pathogenesis, cumulative nature and clinical manifestations of such effects in order to evaluate the risk of such cardiac pathology in humans. The evidence is shown to suggest that the G-related hemorrhage is connected with sympathetic nervous and hormonal catecholamine effects on the heart, and the cardiomyopathy is not indicative of an ischemic or hypoxic pathogenesis. Chronic exposure studies indicate that the G-related cardiopathies may be more related to psychic than to acceleration stresses. Finally, the large amount of clinical cardiologic and histopathological data acquired for humans exposed to various levels of +Gz stress for about 40 years fails to indicate any cardiac damage as a result of +Gz exposure. It is thus concluded that +Gz exposure poses no significant risk for cardiac damage in humans. A.L.W.

A82-32002 Acceleration-induced atrioventricular dissociation - Hemodynamic consequences. J. E. Whinnery (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 432-434. 13 refs.

At rest, compensatory mechanisms are able to make up for the loss of a properly timed atrial systole. At maximal stress or in a severely compromised patient, however, proper atrial function may be crucial for maintaining optimum cardiac output. A case of an apparently healthy male subject who developed A-V dissociation during +Gz stress and subsequently could not maintain vision at the higher (+7 Gz) levels is reported. Anatomic, geometric, and physiologic considerations suggest that the loss of atrial function is probably associated with the loss of roughly 30 torr in arterial pressure during high +Gz stress. Since the subject was an avid jogger, the etiology of the A-V dissociation was considered to be due to physiologically enhanced vagal tone. This case, therefore, suggests that special attention should be given to the physical fitness programs designed for individuals in a unique profession, such as piloting single-seat high-performance fighter aircraft. (Author)

A82-32003 Human tracking performance changes during combined +Gz and + or - Gy stress. J. W. Frazier, D. W. Repperger, D. N. Toth, and V. D. Skowronski (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH). *Aviation, Space*

and *Environmental Medicine*, vol. 53, May 1982, p. 435-439. 9 refs.

An experiment has been conducted on the centrifuge to examine roll-axis tracking performance in both static and stress environments. The stress environments were +5 Gz for 95 sec and combined +5 Gz/+ or - 1 or + or - 2 Gy for 95 sec. Compared to the static condition, performance decrements of 19% were measured at +5 Gz, 45% at combined +5 Gz/+ or - 1 Gy, and 70% at combined +5 Gz/+ or - 2 Gy. Heart rate increases were noted during the stress environments but no significant heart rate differences were noted between the +5 Gz and the combined +5 Gz/+ or - 2 Gy conditions. The conventional lap belt and shoulder harness restraint system, while not optimum, was adequate for these G environments.

(Author)

A82-32004 Mechanism of vertebral fracture in the F/FB-111 ejection experience. B. F. Hearon, H. A. Thomas, and J. H. Raddin, Jr. (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 440-448. 29 refs.

A review of the accident investigation reports of all non-fatal F/FB-111 ejections which occurred from 19 October 1967 to 26 March 1980 was conducted. The available spinal radiographs of the ejectees were also reviewed. The overall rate of vertebral compression fractures among the survived ejectees in a properly functioning module is 29.5% (23 of 78). The general mechanism of vertebral injury is a combined mechanism involving both axial compression and flexion. There is no evidence to indicate a hyperextension injury mechanism during retraction, nor is there evidence to support the presumed efficacy of the crossed-arms bracing procedure recommended for landing impact in modifying the vertebral injury rate. It appears that a significant reduction in the rate of vertebral fractures among F/FB-111 ejectees will require decreasing the acceleration stresses imposed on the crewmembers during landing impact.

(Author)

A82-32005 * Reducing motion sickness - A comparison of autogenic-feedback training and an alternative cognitive task. W. B. Toscano (California, University, San Francisco, CA) and P. S. Cowings (NASA, Ames Research Center, Moffett Field, CA). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 449-453. 11 refs. Grant No. NCA2-OR-665-810.

Eighteen men were randomly assigned to three groups matched for susceptibility to Coriolis motion sickness. All subjects were given six Coriolis Sickness Susceptibility Index (CSSI) tests separated by 5-d intervals. Treatment Group I subjects were taught to control their own autonomic responses before the third, fourth, and fifth CSSI tests (6 h total training). Group II subjects were given 'sham' training in an alternative cognitive task under conditions otherwise identical to those of Group I. Group III subjects received no treatment. Results showed that Group I subjects could withstand the stress of Coriolis acceleration significantly longer after training. Neither of the other two groups changed significantly. (Author)

A82-32006 Discomfort judgments of translational and angular whole-body vibrations. R. W. Shoenberger (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH). *Aviation, Space, and Environmental Medicine*, vol. 53, May 1982, p. 454-457. 6 refs. Contract No. F33615-79-C-0509.

In a previous series of experiments (Shoenberger, 1980) the subjective intensities of translational (Z-axis) and angular (roll, pitch, and yaw) vibrations were compared, using a psychophysical matching technique. To test the validity and generality of the matching results, an independent set of similar data was obtained in the present experiment, using the method of category production. Seated subjects set levels of translational vibrations, in the X-, Y-, and Z-axes, and angular vibrations, in roll and pitch, that they judged to be 'uncomfortable' on a scale of vibration discomfort. Frequencies of 2.5, 3.15, 4.0, 5.0, 6.3, and 8.0 Hz were presented in each vibration direction. As frequency increased the mean acceleration judged to be uncomfortable increased for Y-axis and roll vibrations, decreased for Z-axis vibrations, and was essentially constant for X-axis and pitch vibrations. The Y- and Z-axis results correspond well to equal intensity contours in existing vibration exposure criteria, and the roll results show good agreement with data from the roll matching experiment. The X-axis and pitch results are similar to the results from the pitch matching experiment and indicate the importance of

the backrest in determining the effects of X-axis translational vibrations and angular vibrations in pitch. (Author)

A82-32008 Effect of different runway sizes on pilot performance during simulated night landing approaches. H. W. Mertens and M. F. Lewis (FAA, Civil Aeromedical Institute, Oklahoma City, OK). *Aviation, Space, and Environmental Medicine*, vol. 53, May 1982, p. 463-471. 26 refs.

Visual illusions have been implicated as causal factors in a large number of aircraft accidents during night visual landing approaches. The present study was conducted to quantify the illusions produced by runways of unfamiliar lengths and widths in simulated night approaches. An aircraft simulator with a computer-generated visual display of the runway in a nighttime black hole situation scene was used to measure pilot performance during approaches to runways of constant length but widths varying from 75 to 300 ft following practice at a fixed runway width, and approaches to runways of length varying from 3000 to 9000 ft and widths varying from 100 to 300 ft. Training on a wide runway is found to lower approach angle in approaches to narrow runways, while a narrow practice runway raised approach angles to wider runways; the magnitude of these effects increased as distance from runway threshold decreased. Approach angle in general is observed to decrease as runway width decreased and as length increased. Prior information about runway size had no effect on the responses. A.L.W.

A82-32009 Women at altitude - Cardiovascular responses to hypoxia. B. L. Drinkwater, P. O. Kramar, J. F. Bedi, and L. J. Folinsbee (Washington, University, Seattle, WA). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 472-477. 30 refs. Research supported by the National Geographic Society.

Six women mountaineers, 23-43 years of age, participated in a series of physiological tests prior to and during an expedition to Bhrikupanth (6798 m) in the Indian Himalayas. During a three-phase step test at sea level, carrying 0, 4.5, and 9.0 kg backpack weights, oxygen requirements represented 49.5-54.8% VO₂ max. Recovery heart rates (HR) at 5-15 s were linearly related to exercise HR. At 4250 m, 5-15 s postexercise HR's were significantly higher than those at SL but returned to SL values after 3 min of rest. At 5000 m, HR's remained higher than those at SL throughout recovery. On returning to 4250 m after 3 weeks at higher altitudes, all postexercise HR's were back to SL values. Supine HR's, higher at altitude than at SL during the ascent, returned to SL rates on return to 4250 m. Hemoglobin and hematocrit increased from 13.7 mg% and 42.4% at SL to 16.4 mg% and 52.6% after the climb. Resting blood pressure was significantly elevated at 4250 m during ascent but returned to SL values on the descent. During the cold pressor test, systolic pressure was unaffected by altitude; diastolic pressure increased less at altitude. While HR was unchanged at SL, a significant increase in HR was observed in postclimb CPT tests, even though perceived discomfort decreased. (Author)

A82-32010 Visual acuity in color contrast on cathode ray tubes - Role of luminance, hue, and saturation contrasts. G. Santucci, J. P. Menu, and C. Valot (Centre d'Etudes et de Recherches de Médecine Aéropatiale, Paris, France). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 478-484. 13 refs. Translation.

Three experiments were conducted on 90 flying personnel to determine the role of luminance, hue, and saturation contrasts on angular visual acuity measured on a CRT system. A Snellen E test object was displayed under various visual acuity conditions on a TV screen, in color contrast, using red, yellow, green, cyan, blue, purple, white, and black. The response system gives response times and quality. The three photocolometric parameters are classified through data processing. All other things being equal, the best visual acuity is obtained under a luminance contrast. The first group (red, blue, purple) is better perceived than the second (green, cyan, yellow, white) whatever the other color in simultaneous contrast may be. Higher saturation enhances visual acuity. A curve of mean response times vs. test object sizes is established for the various color couples. The obtained results are of interest for aerospace ergonomics. (Author)

A82-32011 Sex differences in cardiac responses to successive apnea periods. P. Sebert, J. Sanchez, and H. Monod (CNRS,

Laboratoire du Physiologie du Travail, Paris, France). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 485-488. 15 refs.

Cardiac response to breath-holding is generally described as a bradycardia, which is explained by a two-fold mechanism involving the pulmonary mechanoreceptors and the arterial chemoreceptors. This study was conducted to determine the cardiac effects of five successive apnea periods separated by 1 min of free ventilation (FV). Heart rate (HR) and ventilation were measured during this protocol in 12 young subjects (six men, six women). Ventilatory responses during FV periods were similar in both sexes, but HR responses were different during the apnea periods. The men exhibited a bradycardia and the women a tachycardia. Although the statistical significance of the results was weak, they showed a clear tendency which was interpreted as differences in central cardioventilatory interactions. A sex difference in the cardiac consequences of static work from respiratory muscles is also evoked. (Author)

A82-32012 The pathophysiology, presentation, and triage of altitude-related decompression sickness associated with hypobaric chamber operation. D. C. Arthur and R. A. Margulies (U.S. Navy, Naval Submarine Medical Research Laboratory, Groton, CT). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 489-494. 59 refs.

Decompression sickness following excursions to low atmospheric pressures has recently been a topic of confusion and concern. This article provides a reference for management of decompression sickness occurring after exposure to a reduction in ambient pressure in a hypobaric chamber. The pathophysiology, recognition, classification, initial management, definitive treatment, and eventual disposition of these cases are presented in a form which is applicable to all flight surgeons and flight physiologists, especially those with responsibility for utilization of hypobaric chambers. (Author)

A82-32013 The aerospace screening electroencephalogram - An analysis of benefits and costs in the U.S. Air Force. W. D. Everett and S. W. Jenkins (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space and Environmental Medicine*, vol. 53, May 1982, p. 495-501. 18 refs.

Using the techniques of decision analysis, three possible EEG screening strategies for U.S. Air Force pilots are evaluated. Available clinical and epidemiological data are organized so that the relative merits of the three strategies can be assessed by decision makers. The optimal strategy is found to be screening fighter pilot candidates only. Screening all pilot candidates is less 'cost-effective' and using the EEG as a routine screening test in evaluating combat-qualified pilots for nonneurological conditions is the least effective strategy. Needs for further research and unanswered questions are discussed. (Author)

A82-32075 Brain mechanisms of visual attention. R. H. Wurtz, M. E. Goldberg, and D. L. Robinson (National Institutes of Health, National Eye Institute, Bethesda, MD). *Scientific American*, vol. 246, June 1982, p. 124-130, 132, 134, 135.

Neural activity corresponding to the process of the selection of important objects in the visual world has been investigated in experiments with monkeys. By the recording of action potentials in individual brain cells of monkeys trained to fixate on a spot of light, it has been possible to map the receptive fields of individual brain cells and to observe enhancements in the firing rates of cells associated with a region of the visual field toward which a subsequent saccade is directed. For cells in the superior colliculus and frontal eye field, this enhanced response requires a visual stimulus and is spatially selective but comes only as the precursor of a saccade to the corresponding area. In cells of the striate cortex, increases in firing rate are not spatially selective. Only cells in the posterior parietal cortex exhibit a spatially selective enhanced response associated with attention to visual fields in the absence of eye movements. Results thus suggest a neural mechanism of visual attention signalled by enhanced activity in the posterior parietal cortex. A.L.W.

A82-32154 Cell morphological, ontogenic, and genetic reactions to 0-g simulation and hyper-g. W. Briegleb, J. Neubert, A. Schatz, J. R. Hordinsky (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bonn, West

Germany), and A. Cogoli (Zürich, Eidgenössische Technische Hochschule, Zurich, Switzerland). *Acta Astronautica*, vol. 9, Jan. 1982, p. 47-50. 17 refs.

Primary cell reaction under conditions of weightlessness are considered. It is found that two different types of reactions occur. One involves a category of more or less irreversible malfunctions, while the second is related to changed intracellular behavior without immediate consequences for the cell's overall functioning. A description is presented of a number of experiments, taking into account genetic reactions, ontogenetic reactions in early development, effects of spatial orientation, periodic protoplasmic movement, and an activation of lymphocytes. On the basis of observations and calculations, it is found that essential innercell structures are stressed by gravity. Cells compensate these effects by using cybernation. G.R.

A82-32210 * Distribution and enantiomeric composition of amino acids in the Murchison meteorite. M. H. Engel and B. Nagy (Arizona, University, Tucson, AZ). *Nature*, vol. 296, Apr. 29, 1982, p. 837-840. 29 refs. Grant No. NGR-03-002-171.

Studies of the amino acid contents and enantiomeric compositions of a single stone from the Murchison meteorite are reported. Water-extracted and 6M HCl-extracted samples from the meteorite interior of meteorite fragments were analyzed by gas chromatography and combined gas chromatography-chemical ionization mass spectrometry. Examination of the D/L ratios of glutamic acid, aspartic acid, proline, leucine and alanine reveals those amino acids extractable by water to be partially racemized, whereas the acid-extracted amino acids were less racemized. The amino acid composition of the stone is similar to those previously reported, including the absence of serine, threonine, tyrosine, phenylalanine and methionine and the presence of unusual amino acids including such as isovaline, alpha-aminoisobutyric acid and pseudoleucine. It is concluded that the most likely mechanism accounting for the occurrence of nonracemic amino acid mixtures in the Murchison meteorite is by extraterrestrial stereoselective synthesis or decomposition reactions. A.L.W.

A82-32213 Human body clocks and the timing of sleep. A. T. Winfree (Purdue University; Institute for Natural Philosophy, West Lafayette, IN). *Nature*, vol. 297, May 6, 1982, p. 23-27. 104 refs. Research supported by the Institute for Natural Philosophy, U.S. Air Force, and NSF.

An individual living in a cave for four months without external time reference slept and awoke at progressively longer and longer intervals. Possible bases for this circadian rhythm are discussed, including the workings of the suprachiasmatic nuclei and the associated retinohypothalamic tracts, and the release of melatonin as influenced by natural or artificial light. Sleep rhythms are often abnormal in manic-depressives and people with little social contact. Insomnia is also often due to abnormal rhythms, and in the light of this, effective treatment can be instituted. The effect of daylight savings, jet-lag, and shift work on the rhythm are discussed, and procedures for hastening adaptation to a new schedule are described. C.D.

A82-32288 # Stress testing and coronary artery disease - Study of 140 cases on tread mill. M. M. Singh (Indian Air Force, Institute of Aviation Medicine, Bangalore, India), K. V. S. Mani (Indian Air Force, New Delhi, India), and S. Krishnamurti (St. John Medical College, Bangalore, India). *Aviation Medicine*, vol. 25, Dec. 1981, p. 25-31. 20 refs.

A82-32289 # A preliminary study on noise induced hearing loss in serving aircrew of Indian Air Force. K. S. Soodan and B. N. P. Rao (Indian Air Force, Institute of Aviation Medicine, Bangalore, India). *Aviation Medicine*, vol. 25, Dec. 1981, p. 32-34. 10 refs.

A82-32290 # A longitudinal analysis of TH Index and identification of period of acute heat stress. G. Singh and N. Neelakantan (Air Force Academy, Hyderabad, India). *Aviation Medicine*, vol. 25, Dec. 1981, p. 35-37.

Singh (1978) has found that the Temperature Humidity Index (TH index) is a simple and reliable criterion for the evaluation of thermal comfort. The present study is concerned with an analysis of the TH index over three consecutive years, at different periods of the day, to identify periods of heat intolerance as a basis for advanced

planning concerning the assignment of flying tasks. It is found that during the period from April 29 to June 2 symptoms of heat intolerance compromising flight safety may occur in persons at the Air Force Academy particularly during the time from 1330 to 1530 hrs. The nomogram for the TH index can be generally accepted for evaluation of the thermal comfort in operational flying in hot humid weather at various bases. G.R.

A82-32349 # Biological experiments in space biology and gravitation. P. Schiller. *Dornier-Post* (English Edition), no. 1, 1982, p. 36-38.

Equipment for use in biological experiments to be performed on board Spacelab is discussed. Among the necessary equipment for space biology experiments are an incubator, which must maintain a constant temperature in the presence of ambient temperatures ranging from 10 to 35 C, contain few moving parts and be compatible with the Spacelab environment and the installation of a centrifuge, and a space centrifuge for the production of an artificial gravity environment to allow the differentiation between the effects of space radiation and weightlessness. An incubator has been developed to meet these requirements using foam insulation, Peltier elements for heating and cooling and heat transport by a thick aluminum plate. Within this incubator may be placed a centrifuge of maximum rotor diameter 220 mm. Typical experiments envisioned for the system include the study of the daily rhythm in algae and the influence of weightlessness on spore formation in bacteria and yeast. In addition, special procedures have been developed for working with liquids under conditions of weightlessness. A.L.W.

A82-32390 The effects of hypoxia on serial response time. B. Fowler, P. L. White (York University, Downsview, Ontario, Canada), G. R. Wright, and K. N. Ackles (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *Ergonomics*, vol. 25, Mar. 1982, p. 189-201. 31 refs.

The effects of hypoxia on choice reaction time and movement time are examined using a visual serial choice reaction time task in which the number of choices and the distance over which a movement has to be made can be varied. Hypoxia is induced with a low percentage oxygen mixture, and blood oxygen saturation is controlled at 64.3%, which is equivalent to 6700 m. It is found that hypoxia increases simple reaction time by decreasing the effective brightness of the stimulus and interfering with some aspect of the information processing system controlling movement time. An examination of individual latency distributions indicates that hypoxia acts to slow performance by shifting the whole distribution. The role of blocking in hypoxia is also investigated by examining the shape of the frequency distributions of response latencies. D.L.G.

A82-32413 Perceptual components of computer displays. R. N. Haber and L. Wilkinson (Illinois, University, Chicago, IL). *IEEE Computer Graphics and Applications*, vol. 2, May 1982, p. 23-26, 28 (5ff.). 41 refs.

Advances in cognitive psychology have revealed the varieties of architecture and operating systems underlying the information processing tasks humans normally perform. Information was obtained regarding a number of principles which specify the optimal organization of information for various types of human information processing. A description is presented of some of these organizational principles, especially those which affect communication between a computer and a user. Since this communication is frequently visual, most of the presented material concerns principles of cognition which apply to graphic information. Attention is given to the structure of cognitive organization, two principles of visual perception, the use of spatial arrangement to represent structure, and the representation of structure with the aid of visual features, movement, three-dimensional objects, and considerations of meaning. G.R.

A82-32423 * Velocity and attenuation of sound in arterial tissues. J. A. Rooney (Maine, University, Orono, ME), P. M. Gammell (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA; Southern California, University, Los Angeles, CA), J. D. Hestenes (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), H. P. Chin, and D. H. Blankenhorn (Southern California, University, Los Angeles, CA). *Acoustical Society of America, Journal*, vol. 71, Feb. 1982, p. 462-466. 15 refs. NASA-supported research; Contract No. NIH-NO1-HV-7-2930.

The velocity of sound in excised human and canine arterial tissues is measured in order to serve as a basis for the development and application of ultrasonic techniques for the diagnosis of atherosclerotic lesions. Measurements of sound velocity at different regions of 11 human and six canine aortas were made by a time delay spectrometer technique at frequencies from 2 to 10 MHz, and compared with ultrasonic attenuation parameters and the results of biochemical assays. Sound velocity is found to increase with increasing attenuation at all frequencies, and with increasing collagen content. A strong dependence of sound velocity on cholesterol content or low calcium contents is not observed, although velocities of up to 2000 m/sec are observed in highly organized calcified lesions. A decrease in velocity with decreasing temperature is also noted. It is thus concluded that it is principally the differences in tissue collagen levels that contribute to image formation according to sound velocity. A.L.W.

A82-32496 User response characteristics for sequential displays. J. R. Ims (Aerospace Corp., Systems Simulation and Analysis Dept., Los Angeles, CA). In: *Display technology II: Proceedings of the Meeting, Los Angeles, CA, February 10, 11, 1981*. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 28-34. Contract No. F04701-80-C-0081.

The obscuring of a brief visual target stimulus (TS) by either a subsequent, preceding, or simultaneous visual mask stimulus (MS), has been of particular interest in connection with studies of human visual information processing. When the contours of the MS do not overlap but are contiguous with the contours of the TS, the procedure is called metacontrast. The present investigation is concerned with a metacontrast study to explore the influence of stimulus variation on Type B (or U-shaped) masking functions. The results of two experiments are discussed, taking into account a comparison of shape and location responses. Applications of the considered characteristics can be found on the ground in air traffic control displays and in the airborne, real-time, threat location, head-up displays. G.R.

A82-32525 Eye modelling. I. Overington (British Aerospace Public, Ltd., Co., Dynamics Group, Bristol, England). In: *Assessment of imaging systems: Visible and infrared; Proceedings of the Symposium, Reading, England, April 7-9, 1981*. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 182-190. 45 refs.

Early stages of visual image processing which influence image formation and transformation in the eye/brain system are discussed and various approaches to visual function modeling are examined. Attention is given to models associated with display/observer interface; foveal threshold performance models relating thresholds of performance to quality, size, and noise of the retinal image and to background luminance; and foveal suprathreshold models establishing the apparent image fidelity. Finally, search models, which seek to relate distributed visual performance to the ability to carry out search tasks on displays, are discussed. V.L.

A82-32529 Recognition of thermal images - Effects of scan-line density and signal-to-noise ratio. A. van Meeteren and S. Mangoubi (Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Instituut voor Zintuigfysiologie TNO, Soesterberg, Netherlands). In: *Assessment of imaging systems: Visible and infrared; Proceedings of the Symposium, Reading, England, April 7-9, 1981*. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 230-238. 14 refs.

A series of recognition experiments have been carried out in which 69 thermograms of military vehicles made in the field were displayed indoors using a flying spot scanner system, and subjects were asked to identify the vehicles out of six alternatives. In each session, all 69 pictures were presented in random order with the same scan-line density and the same amount of electronically added noise. Large differences are found in the recognizability between different vehicles and, in particular, between different views of the same vehicle, with hot spot front views being most difficult. An average identification score of 70% is obtained at about two scan lines per meter (measured over real objects) when no noise is added. It is concluded that scan-line density is of primary importance in

prediction models and in design considerations whereas the effect of noise is small. V.L.

A82-32692 Spectral character of sunlight modulates photosynthesis of previtamin D3 and its photoisomers in human skin. J. A. MacLaughlin, R. R. Anderson, and M. F. Holick (Massachusetts General Hospital, Boston; MIT, Cambridge, MA). *Science*, vol. 216, May 28, 1982, p. 1001-1003. 12 refs. Research supported by Duro-Test Corp.; Grant No. NIH-AM-27334.

A82-32800 Deep-sea bacteria - Isolation in the absence of decompression. H. W. Jannasch, C. O. Wirsen, and C. D. Taylor (Woods Hole Oceanographic Institution, Woods Hole, MA). *Science*, vol. 216, June 18, 1982, p. 1315-1317. 22 refs. NSF Grants No. OCE-77-19766; No. OCE-79-19178.

Sampling and pure culture isolation of deep-sea bacteria without loss of in situ pressure is required in order to determine the viability of decompression-sensitive strains. This was achieved by using a pressure-retaining sterilizable seawater sampling system in connection with a prepressurized hyperbaric isolation chamber. Rates of growth and substrate uptake of the majority of isolates showed highly barotolerant characteristics, while the remainder (4 out of 15) exhibited barophilic characteristics. (Author)

A82-32826 * Effect of limb immobilization on skeletal muscle. F. W. Booth (Texas, University, Houston, TX). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1113-1118. 48 refs. Grant No. NIH-AM-19393; Contract No. NAS9-15388.

Current knowledge and questions remaining concerning the effects of limb immobilization on skeletal muscle is reviewed. The most dramatic of these effects is muscle atrophy, which has been noted in cases of muscles fixed at or below their resting length. Immobilization is also accompanied by a substantial decrease in motoneuronal discharges, which results in the conversion of slow-twitch muscle to muscle with fast-twitch characteristics. Sarcolemma effects include no change or a decrease in resting membrane potential, the appearance of extrajunctional acetylcholine receptors, and no change in acetylcholinesterase activity. Evidence of changes in motoneuron after hyperpolarization characteristics suggests that the muscle inactivity is responsible for neuronal changes, rather than vice versa. The rate of protein loss from atrophying muscles is determined solely by the first-order rate constant for degradation. Various other biochemical and functional changes have been noted, including decreased insulin responsiveness and protein synthesis. The model of limb immobilization may also be useful for related studies of muscle adaptation. A.L.W.

A82-32827 Characteristics of adjustment of lung diffusing capacity to work. J. T. Fisher and F. J. Cerny (Buffalo, Children's Hospital, Buffalo, NY). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1124-1127. 11 refs.

The kinetic of changes in the pulmonary diffusing capacity (DL) were studied in the initial 90 sec following the onset of exercise after rest, and during the transition from moderate to heavy exercise. Four male subjects performed a series of trials on a braked bicycle ergometer while being monitored for oxygen uptake, DL for CO, breath He concentrations, and DL for CO post-exercise levels. Measurements were performed under submaximal, maximal, and steady state conditions. The DL response to all exercise conditions was determined by a least-squares curve-fitting analysis to fit a first-order exponential equation. Significant increases in the DL were detected in going from the rest-to-work condition as opposed to the transitions to higher work loads. The results indicate a fast-response DL mechanism which is different from a component which operates in changes of steady-state levels of exercise. M.S.K.

A82-32828 Effect of training on beta-adrenergic receptor number in rat heart. R. L. Moore, M. Riedy, and P. D. Gollnick (Washington State University, Pullman, WA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1133-1137. 36 refs. Grant No. NIH-HL-18527.

A82-32829 Thermoregulatory influences on common carotid blood flow in the dog. M. A. Baker, M. J. Hawkins, and R. D.

Rader (California, University, Riverside, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1138-1146. 36 refs. NSF Grant No. BNS-79-01006; Grant No. PHS-RR-09070.

The relationship of blood flow through the common carotid artery to respiratory evaporation under different conditions of heat stress in the dog is investigated in light of the importance of the common carotid artery as the sole supplier of blood to areas of evaporative cooling in panting mammals. Measurements of common carotid flow were made by an ultrasonic flow probe under conditions of rest at ambient temperatures between 25 and 50 C, hypothalamic heating, and light and strenuous exercise at ambient temperatures of 25 and 35 C. Determinations of respiratory water loss reveal a striking temporal correspondence between evaporation from the nose and mouth and common carotid blood flow. Carotid blood flow and respiratory evaporation are both observed to increase with increasing temperature and hypothalamic heating. Both rates increase rapidly at the onset of exercise, with peak levels related to the peak rectal temperature reached. Most of the increased flow is deduced to be destined for the evaporative surfaces of the mouth, tongue and nose and is thus related to thermoregulatory activity. A.L.W.

A82-32830 Central and peripheral inputs in sweating regulation during thermal transients. J. P. Libert, V. Candas, J. J. Vogt, and P. Mairiaux (CNRS, Centre d'Etudes Bioclimatiques, Strasbourg, France). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1147-1152. 22 refs.

Eight nude resting men were exposed to consecutive heating-cooling cycles of air and wall temperatures varying from 28 to 45 C in a sawtooth pattern using one of the following slopes: + or - 3.40, 2.27, 1.70, 1.42, or 1.13 C/min. Ambient vapor pressure and air velocity were kept constant at 20.0 mbar and 0.9 m/sec, respectively. Continuous measurements were made of rectal, esophageal, and mean skin temperatures. Local upper limb sweating response was measured from an arm chamber under a local thermal clamp. The results point out the insufficiency of an explanation based on a simple additive function of core and skin temperatures for describing sweating regulation. During transient thermal loads, a multiplicative interaction of mean skin and core temperatures must also be taken into account for describing the central drive for the local sweating response. The interindividual differences observed in the sweating regulation mechanism seem to be linked to a nonlinearity in the response of the thermoregulatory system. (Author)

A82-32831 Mechanical properties of rat lung during prolonged hypercapnia. Y.-L. Lai, W. J. E. Lamm, and J. Hildebrandt (Virginia Mason Research Center, Seattle, WA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1156-1160. 25 refs. Grants No. NIH-HL-20568; No. NIH-HL-27064; No. NIH-HL-14854.

A82-32832 Effects of hyperventilation on pulmonary blood flow and recirculation time of humans. S. Matalon, N. Dashkoff, M. S. Nesarajah, F. J. Klocke, and L. E. Farhi (New York, State University; Erie County Medical Center, Buffalo, NY). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1161-1166. 23 refs. Grants No. NIH-HL-23190; No. NIH-HL-15194.

Direct invasive techniques were used to measure the effects of hyperventilation on the pulmonary blood flow and on the recirculation time of helium and of carbon dioxide in humans. The subjects hyperventilated with a tidal volume of 1.5 liters (BTPS) and a frequency of 20 or 30 breaths/min. There was no significant change in pulmonary blood flow from control at either level of hyperventilation. Helium first appeared in the pulmonary artery within 12 sec from the onset of hyperventilation and increased by approximately 0.7% of its equilibrium arterial value per second at both levels of hyperventilation. In contrast, the partial pressure of CO2 in mixed venous blood remained at base-line level until 43 sec from the onset of hyperventilation. It is concluded that hyperventilation at 30 or 45 l/min with constant tidal volume does not significantly affect the value of pulmonary blood flow and that the amount of recirculation of the two gases does not result in underestimation of pulmonary blood flow when this variable is measured by indirect respiratory rebreathing techniques. (Author)

A82-32833

A82-32833 Finger temperature after a finger-cooling test - Influence of air temperature and smoking. T. J. M. Cleophas, J. F. M. Fennis, and A. van't Laar (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1167-1171. 27 refs.

A82-32834 Blood-gas CO₂ equilibration in lungs of un-anesthetized dogs during hypercapnia. D. B. Jennings, M. Meyer, T. Stokke, J. Piper, and P. Scheid (Max-Planck-Institut für experimentelle Medizin, Göttingen, West Germany). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1177-1180. 8 refs.

A82-32835 Effect of pH on sensation and vastus lateralis electromyogram during cycling exercise. C. E. Kostka and E. Cafarelli (York University, Toronto, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1181-1185. 29 refs. Natural Sciences and Engineering Research Council of Canada Grant No. 46633.

Exercise-induced blood pH shifts affecting the sensory response and the electromyographic (EMG) activity were examined, as were possible correlations between changes in the EMG and the level of sensory intensity. Six males averaging 24 yr of age performed cycling exercise while being monitored before and after for oxygen uptake volume, heart rate, pH, plasma lactate, and hematocrit, while also being wired for EMG by means of electrodes attached to the vastus lateralis. Acid-base shifts were induced through ingestion of NH₄Cl or NaHCO₃, and placebos were also administered. Two-factor analysis of variance was performed on all data, and significant F ratios were partitioned with the Newman-Keuls multiple comparison procedure. The data indicated a slight hemodilution in alkalosis, hemoconcentration in acidosis, and hemoconcentration due to exercise alone. Acidosis increased sensory activity during heavy exercise, when plasma lactate was also higher in alkalosis. M.S.K.

A82-32836 Acute hypervolemia, cardiac performance, and aerobic power during exercise. I.-L. Kanstrup and B. Ekblom (Karolinska Institutet, Stockholm, Sweden). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1186-1191. 27 refs.

An examination of the effects of plasma volume expansion on aerobic power and cardiac response at different levels of exercise is reported. Fourteen males within 5 years of 27 yr old were examined for heart rate, maximal oxygen uptake, blood lactate concentration, blood and plasma volumes, blood pressure, hematocrit, and cardiac output during maximal and submaximal bicycle exercise. A 6% dextran in solution plasma expansion fluid was fed intravenously into the subjects after the first week of exercise, followed two weeks later by reducing the dextran infusion in eight of the subjects by blood-letting. Blood volume was increased by the infusion, as was the cardiac output, by 7.8 going to 8.7 l/min. It was concluded that acute plasma blood volume expansion produced increased cardiac output and stroke volume at rest and during exercise, increased maximum cardiac output, and the effect was more pronounced during exercise than rest. M.S.K.

A82-32837 Dynamics of cardiac, respiratory, and metabolic function in men in response to step work load. Y. Miyamoto, T. Hiura, T. Tamura, T. Nakamura, J. Higuchi, and T. Mikami (Hokkaido University, Sapporo, Japan). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1198-1208. 32 refs.

A82-32838 Reduction of the edema of acute hyperoxic lung injury by granulocyte depletion. D. M. Shasby, R. B. Fox, R. N. Harada, and J. E. Repine (Colorado, University, Denver, CO). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1237-1244. 18 refs. Research supported by the American Heart Association, Kroc Foundation, and Council for Tobacco Research; Grants No. NIH-HL-07085; No. NIH-HL-24248.

A82-32839 Increases in plasma beta-endorphin/beta-lipotropin immunoreactivity after treadmill running in humans. P. A. Farrell, W. K. Gates, M. G. Maksud, and W. P. Morgan (Wisconsin,

University, Milwaukee; Wisconsin, University, Madison, WI). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1245-1249. 36 refs.

A82-32840 Effects of acute cold exposure on muscle amino acid and protein in rats. O. L. K. Smith, G. Huszar, S. B. Davidson, and E. Davis (John B. Pierce Foundation Laboratory; Yale University, New Haven, CT). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1250-1256. 30 refs. Research supported by the Kingsley Foundation; Grant No. NIH-HD-12183.

The effects of acute cold exposure on muscular amino acid release, protein synthesis and protein breakdown are studied in relation to those changes in protein metabolism brought about by fasting. Blood amino acid concentrations were determined in rats functionally hepatectomized (eviscerated) following exposure to 4°C for 24 h or following fasting, and it was found that while plasma amino nitrogen remained about constant in cold exposure and fasting, evisceration lead to an enhanced rise in total amino acids and alanine, with the increment in alanine greatest in starved rats. The injection of insulin or adrenomedullation in cold-exposed eviscerated rats suppressed the rise in plasma amino acids, while induced diabetes or epinephrine injection in eviscerated nonexposed rats enhanced the rise in plasma alpha-nitrogen. In intact rats, the urinary secretion of 3-methylhistidine was unaffected by cold. Results suggest that amino acid loss from tissues during acute cold stress is due to sympathetic activity, which depresses plasma insulin to levels impairing protein synthesis, rather than the enhanced breakdown of muscle protein or alanine synthesis. A.L.W.

A82-32841 Effect of aerobic conditioning on cardiovascular response to isometric exercise. B. J. Morgan, H. L. Brammell, D. L. Sable, M. L. Morton, and L. D. Horwitz (Colorado, University, Denver, CO). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1257-1260. 10 refs. Research supported by Ayerst Laboratories; Grant No. NIH-HL-24400.

Trained and untrained muscle groups were examined to compare the cardiovascular response during isometric handgrip exercise (IHE) and quadriceps exercise (IQE) before and after intensive training employing dynamic leg exercise. Beta-adrenaline blocking during the aerobic portion was also tested for effects on the static exercise. Seventeen males between 21-35 were subjected to treadmill and then isometric exercises, then trained in calisthenics for 3 days/wk for 5 weeks. Placebo or propranolol were given the subjects during the training period. Monitoring comprised the plasma propranolol levels, O₂ uptake, blood pressure, and pulse rate. Intake of propranolol was found to cause a lessening of the maximum heart rate in both at-rest and treadmill exercise trials. After training, however, only the placebo-added group displayed diminished heart rate and systolic pressure and an increase in the maximal oxygen uptake volume, although limited to trained muscle groups. M.S.K.

A82-32842 * Induced venous pooling and cardiorespiratory responses to exercise after bed rest. V. A. Convertino, H. Sandler, P. Webb, and J. F. Annis (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA; Webb Associates, Yellow Springs, OH). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1343-1348. 28 refs.

Venous pooling induced by a specially constructed garment is investigated as a possible means for reversing the reduction in maximal oxygen uptake regularly observed following bed rest. Experiments involved a 15-day period of bed rest during which four healthy male subjects, while remaining recumbent in bed, received daily 210-min venous pooling treatments from a reverse gradient garment supplying counterpressure to the torso. Results of exercise testing indicate that while maximal oxygen uptake endurance time and plasma volume were reduced and maximal heart rate increased after bed rest in the control group, those parameters remained essentially unchanged for the group undergoing venous pooling treatment. Results demonstrate the importance of fluid shifts and venous pooling within the cardiovascular system in addition to physical activity to the maintenance of cardiovascular conditioning. A.L.W.

A82-32843 A computer linear regression model to determine ventilatory anaerobic threshold. G. W. Orr, H. J. Green, R. L. Hughson, and G. W. Bennett (Waterloo, University, Waterloo, Ontario, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, May 1982, p. 1349-1352. 6 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada and University of Waterloo.

The anaerobic threshold has generally been determined by simple visual inspection of ventilation or other gas-exchange data obtained during incremental exercise. To establish objective criteria for the determination of anaerobic threshold, a computer algorithm has been developed that models the ventilatory response to exercise using multisegment linear regression. The best-fit regression model is chosen by minimizing the pooled residual sum of squares. The anaerobic threshold is reported as the first break point in that model. The computer-determined anaerobic threshold values for 37 subjects were compared with the subjectively determined values as chosen by four independent observers. The observers' estimates, when pooled to yield a single value for each subject, gave a mean value for the gas-exchange anaerobic threshold of 2.26 ± 0.69 l/min. The estimates by the computer method averaged 2.21 ± 0.65 l/min. The correlation coefficient for these two methods was 0.94. (Author)

A82-32879 Iterative reconstruction-reprojection - An algorithm for limited data cardiac-computer tomography. M. Nassi, W. R. Brody, B. P. Medoff, and A. Macovski (Stanford University, Stanford, CA). *IEEE Transactions on Biomedical Engineering*, vol. BME-29, May 1982, p. 333-341. 13 refs. Research supported by the American Heart Association and Gran Mariscal de Ayacucho Foundation of Venezuela; Grant No. NIH-1-R01-HL-25905.

Cardiac X-ray computed tomography (CT) has been limited due to scanning times which are considerably longer (greater than 1 sec) than required to resolve the beating heart (less than 0.1 sec). The otherwise attractive convolution-back projection algorithm is not suited for CT image reconstruction from measurements comprising an incomplete set of projection data. In this paper, an iterative reconstruction-reprojection (IRR) algorithm is proposed for limited projection data CT image reconstruction. At each iteration, the missing views are estimated based on reprojection, which is a software substitute for the scanning process. The standard fan-beam convolution-back projection algorithm is then used for image reconstruction. The proposed IRR algorithm enables the use of convolution-back projection in limited angle-of-view and in limited field-of-view CT cases. The potential of this method for cardiac CT reconstruction is demonstrated using computer simulated data.

(Author)

A82-32880 Computerized ultrasonic arteriography - A new technique for imaging the carotid bifurcation. R. D. Miles, J. B. Russell, and D. S. Sumner (Southern Illinois University, Springfield, IL). *IEEE Transactions on Biomedical Engineering*, vol. BME-29, May 1982, p. 378-381. 6 refs.

The development of a new noninvasive computerized technique for producing simultaneous lateral, anterior-posterior, and transverse views of the carotid bifurcation for the diagnosis of occlusive disease is described. These multiplanar views have been used to detect greater than or equal to 40 percent diameter reductions with a sensitivity of 100 percent and a specificity of 85 percent in 94 comparisons with vessel X-rays.

(Author)

A82-33135 † The carbohydrase system of the small intestine of rats of various ages following heat and cold exposures (Karbogid-raznaia sistema tonkoi kishki kryz raznogo vozrasta posle teplovykh i kholodovykh vozdeistvii). K. R. Rakhimov, A. I. Demidova, and N. V. Aleksandrova (Akademiia Nauk Uzbekskoi SSR, Institut Fiziologii, Tashkent, Uzbek SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Apr. 1982, p. 508-514. 27 refs. In Russian.

A82-33276 Taxonomic relations between archaeobacteria including 6 novel genera examined by cross hybridization of DNAs and 16S rRNAs. J. Tu, D. Prangishvili, H. Huber, G. Wildgruber, W. Zillig, and K. O. Stetter (Max-Planck-Institut für Biochemie, Munich, West Germany). *Journal of Molecular Evolution*, vol. 18, Apr. 1982, p. 109-114. 15 refs. Deutsche Forschungsgemeinschaft Contract No. SFB-51.

A82-33277 Enzymatic characterization of peptidic materials isolated from aqueous solutions of ammonium cyanide /pH9/ and hydrocyanic acid /pH6/ exposed to ionizing radiation. V. Niketic, S. Neskovic (Beograd, Univerzitet, Belgrade, Yugoslavia), Z. Draganic, and I. Draganic (Institut za Nuklearne Nauke, Vinca, Yugoslavia). *Journal of Molecular Evolution*, vol. 18, Apr. 1982, p. 130-136. 31 refs. Research supported by the Serbian Republic Council of Scientific Research.

A82-33278 * Binding of nickel /II/ to 5-prime-nucleoside monophosphates and related compounds. J. B. Orenberg (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field; San Francisco State University, San Francisco, CA), K. M. Kjos, R. Winkler, J. Link, and J. G. Lawless (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field, CA). *Journal of Molecular Evolution*, vol. 18, Apr. 1982, p. 137-143. 33 refs.

The interactions of Ni(II) cation with a representative suite of purine bases and the respective nucleosides and nucleotides have been studied by ultraviolet difference spectroscopy. Apparent association constants were determined for each system at pH 7.0, using computer linear regression coupled with an iteration technique. The specificity of binding of Ni(2+) for the purine nucleotides studied at pH 7.0 was 5-prime-GMP greater than 5-prime-AMP; a similar ordering was also found for the respective nucleosides and bases. In this study binding was not observed for the suite of pyrimidines used, although a Ni(2+) -cytidine complex has been observed (Fiskin and Beer, 1965). It was also found that Ni(2+) bound more strongly to the purine 5-prime-nucleotides than to the respective nucleosides and bases. These trends are explained in terms of metal-ligand bonds and available bonding positions on the ligands. A role for metal-ion-nucleotide types of complexes is suggested in the processes that might have given rise to the origin of life. (Author)

A82-33280 * Comets - Chemistry and chemical evolution. B. Donn (NASA, Goddard Space Flight Center, Laboratory for Extraterrestrial Physics, Greenbelt, MD). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 157-160. 45 refs.

Research on the chemical composition and conditions in comets and their possible role in the origin of life on earth is surveyed. The inorganic and organic compounds and ions indicated in the ultraviolet and visible spectra of comets are noted, and evidence for the existence of at least a small proportion of complex organic molecules in comets is presented. It is then pointed out that while cometary material could have reached the earth and provided volatile elements from which biochemical compounds could have formed, it is unlikely that a cometary nucleus could have withstood the temperatures and pressures necessary to sustain an environment in which life could have originated.

A.L.W.

A82-33282 Organic synthesis from reducing models of the atmosphere of the primitive earth with UV light and electric discharges. A. R. Bossard, F. Raulin, D. Mourey, and G. Toupance (Paris XII, Université, Créteil, Val-de-Marne, France). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 173-178. 34 refs. Research supported by the Centre National d'Etudes Spatiales.

The organic syntheses obtained in experiments with a reducing model of the primitive earth atmosphere where energy is supplied by UV light and electrical discharges are compared. A review of the results of experiments conducted with far-UV radiation and corona discharges in gaseous mixtures of methane with varying amounts of nitrogen, ammonia and water vapor indicates UV light to favor the production of saturated over unsaturated carbon chains, while electrical discharges are efficient producers of unsaturated carbon chains. In experiments with CH₄-NH₃ and CH₄-N₂ mixtures, UV radiation leads to the formation of HCN, CH₃CN and C₂H₅CN, whereas electric discharges can produce nitriles in CH₄-N₂ mixtures. Finally, it has been noted that only limited quantities of oxygen-containing organics are synthesized in CH₄-H₂O mixtures using either UV light or electric discharges. It is thus concluded that, despite their relative scarceness, electric discharges played the major role in the synthesis of atmospheric precursors of biomonomers.

A.L.W.

A82-33283 * Interaction between ATP, metal ions, glycine, and several minerals. J. Rishpon, P. J. O'Hara, J. G. Lawless (NASA, Ames Research Center, Moffett Field, CA), and N. Lahav. *Journal of*

Molecular Evolution, vol. 18, May 1, 1982, p. 179-184. 21 refs.

Interactions between ATP, glycine and montmorillonite and kaolinite clay minerals in the presence of various metal cations are investigated. The adsorption of adenine nucleotides on clays and $Al(OH)_3$ was measured as a function of pH, and glycine condensation was followed in the presence of ATP, $ZnCl_2$, $MgCl_2$ and either kaolinite or montmorillonite. The amounts of ATP and ADP adsorbed are found to decrease with increasing pH, and to be considerably enhanced in experiments with $Mg(2+)$ and $Zn(2+)$ -montmorillonite with respect to $Na(+)$ -montmorillonite. The effects of divalent cations are less marked in kaolinite. Results for $Al(OH)_3$ show the importance of adsorption at clay platelet edges at high pH. The decomposition of ATP during drying at high temperature is observed to be inhibited by small amounts of clay, vacuum, or $Mg(2+)$ or $Zn(2+)$ ions, and to be accompanied by peptide formation in the presence of glycine. Results suggest the importance of $Zn(2+)$ and $Mg(2+)$ in chemical evolution. A.L.W.

A82-33284 * Oligonucleotide formation catalyzed by mononucleotide matrices. R. Lohrmann (Salk Institute for Biological Studies, San Diego, CA). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 185-195. 16 refs. Grants No. NGR-05-067-001; No. NIH-GM-13435.

$Pb(2+)$ -containing precipitates of mononucleotides form matrices which catalyze the self-condensation of nucleotide 5-prime-phosphorimidazolides and their condensation with nucleosides. The reactions exhibit base-pairing specificity between matrix nucleotide and substrate, and usually follow the Watson-Crick pairing rules. Although purine polynucleotides do not facilitate the oligomerization of pyrimidine nucleotide monomers in solution, it is interesting that purine-containing matrices do catalyze such a reaction. The significance of the results in the context of the prebiotic evolution of polynucleotides is discussed. (Author)

A82-33285 * Synthesis of phosphatidylcholine under possible primitive earth conditions. M. Rao, J. Eichberg, and J. Oro (Houston, University, Houston, TX). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 196-202. 33 refs. Research supported by the Robert A. Welch Foundation; Grants No. NGR-44-004-002; No. NIH-NS-12493-04.

Using a primitive earth evaporating pond model, the synthesis of phosphatidylcholine was accomplished when a reaction mixture of choline chloride and disodium phosphatide, in the presence of cyanamide and traces of acid, was evaporated and heated at temperatures ranging from 25 to 100 C for 7 hours. Optimum yields of about 15% were obtained at 80 C. Phosphatidylcholine was identified by chromatographic, chemical and enzymatic degradation methods. On enzymatic hydrolysis with phospholipase A2 and phospholipase C, lysophosphatidylcholine and phosphorylcholine were formed, respectively. Alkaline hydrolysis gave glycerophosphorylcholine. The synthesis of phosphatidylcholine as the major compound was accompanied by the formation of lysophosphatidylcholine in smaller amounts. Cyanamide was found to be essential for the formation of phosphatidylcholine, and only traces of HCl, of the order of that required to convert the disodium phosphatide to free phosphatidic acid were found necessary for the synthesis. This work suggests that phosphatidylcholine, which is an essential component of most biological membranes, could have been synthesized on the primitive earth. (Author)

A82-33286 Encapsulation of macromolecules by lipid vesicles under simulated prebiotic conditions. D. W. Deamer and G. L. Barchfeld (California, University, Davis, CA). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 203-206. 9 refs.

Phospholipid vesicles (liposomes) were subjected to dehydration-hydration cycles in the presence of 6-carboxyfluorescein or salmon sperm DNA. It was found that the vesicles fused into

multilamellar structures during dehydration with solutes trapped between the lamellae. Upon rehydration the lamellae swelled and formed large vesicular structures containing solute. This model can be used to study encapsulation of macromolecules by lipid membranes to form protocellular structures under prebiotic conditions. (Author)

A82-33287 * A theory for the origin of a self-replicating chemical system. II - Computer simulation of the autogen. D. H. White and M. S. Raab (Santa Clara, University, Santa Clara, CA). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 207-216. 14 refs. Grants No. NCA2-OR-685-702; No. NCA2-OR-685-806.

In order to better understand the feasibility and limitations of the autogen (White 1980), a computer simulation based on the fluctuating clay environment was used to test whether autocatalytic growth would occur under various conditions. The results suggest that overall accuracies of replication and translation in the range of 90% and 10%, and protoenzyme turnover numbers of 10-120 monomers/protoenzyme/day are adequate for exponential growth. Nucleation of the components of the autogen from random background oligomers would be extremely rapid if oligomers lengths 2-6 were adequately functional, whereas oligomer lengths much greater than 10 are prohibited. The autogen would most likely nucleate and grow to dominance either rapidly (10-100 cycles of roughly 1 day each) or not at all. (Author)

A82-33288 * Pyrolysis of Precambrian kerogens - Constraints and capabilities. B. Nagy (Arizona, University, Tucson, AZ). *Journal of Molecular Evolution*, vol. 18, May 1, 1982, p. 217-220. 41 refs. Grant No. NGR-03-002-171.

Precambrian kerogens are currently considered to be the primary candidates for the search of biochemical fossils. Degradation of kerogens by relatively 'mild' pyrolysis techniques, such as under high vacuum, can liberate indicative structural moieties which were incorporated in, and perhaps shielded by, these solid and highly condensed, basically aromatic substances. It is necessary to observe analytical constraints (sample size and shape, temperature, pressure, time, etc.) in order to prevent an overabundant yield of secondary pyrolyzates (inter- and intramolecular rearrangements) which can prevent kerogen characterization. Potential biochemical fossils have been found in Precambrian kerogens. Demonstrable syngenetic biochemical fossils are expected after kerogen diagenesis and catagenesis is understood in sufficient detail, and when pyrolysis is augmented by multiple, improved analytical techniques. (Author)

A82-33394 † Industrial hygiene and the prophylaxis of occupational diseases in work with lasers (Gigiena truda i profilaktika proftopatologii pri rabote s lazerami). V. P. Zhokhov, A. A. Komarova, L. I. Maksimova, V. R. Muratov, Iu. P. Pal'tsev, and A. I. Semenov. Moscow, Izdatel'stvo Meditsina, 1980. 208 p. 109 refs. In Russian.

The book treats questions of the protection of workers from laser radiation and methods for the prophylaxis and therapy of laser-induced injuries in persons exposed to laser radiation in the work environment. Following a review of the fundamental principles and characteristics of lasers and the areas of laser applications, the laser radiation field is discussed, with particular emphasis on methods for the measurement of coherent field intensity. Mechanisms for the biological effects of laser radiation are examined, and attention is given to the effects of laser radiation on the visual organs and on the skin. Clinical data concerning the physiological condition of laser specialists is reviewed, and the establishment of norms for laser radiation is discussed. Aspects of industrial hygiene in work with lasers are then considered, including the shielding of the visual organs from direct and reflected laser radiation and the medical surveillance of laser workers. A.L.W.

A82-33595 **Studies on structure and function of chloroplasts - Reconstitution of photophosphorylation activity by combining the deficient membranes of chloroplasts with crista membrane fragments of mitochondria.** S. Li, J. Xiao, and J. Cai (Chinese Academy of Sciences, Plant Physiology Institute, Shanghai, People's Republic of China). *Scientia Sinica*, vol. 24, Nov. 1981, p. 1575-1584. 8 refs.

A82-33600 **The nature of radiation damage of haemopoietic stem cells under continuous irradiation at low dose rate.** Z. Wu, X. Jiang, S. Shen, S. Tan, and H. Xue (Academy of Military Medical Sciences, Institute of Radiation Medicine, Beijing, People's Republic of China). *Scientia Sinica*, vol. 24, Dec. 1981, p. 1743-1752. 15 refs.

A82-33726 † **Myoglobinemia as a criterion for the early diagnosis of acute myocardial infarction /Literature review/ (Mioglobinemii kak kriterii rannei diagnostiki ostrogo infarkta miokarda /Obzor literatury/).** D. Ia. Shurygin, Iu. N. Shishmarev, and A. M. Grachev. *Voenno-Meditsinskii Zhurnal*, Apr. 1982, p. 33-37. 33 refs. In Russian.

The potential for the use of myoglobinemia as an indicator of cardiac damage is considered on the basis of literature data. The specificity of other biochemical indicators of myocardial infarction is discussed and it is pointed out that in contrast to these factors, the differential diagnosis of heart damage from elevated blood myoglobin levels poses no problem. Spectrophotometric and immunologic methods for the detection of myoglobinemia are examined, and experience with the use of these methods in patients with acute myocardial infarction is reviewed. Analysis of the time characteristics of the rise in plasma myoglobin following acute myocardial infarction as well as its complications, stenocardia, muscular diseases and muscular damage indicates that a transitory myoglobinemia is a reliable indicator of acute myocardial infarction, appearing earlier than elevations in plasma enzyme and isoenzyme levels. A.L.W.

A82-33727 † **Psychosomatic self-regulation - An effective method for sustaining pilot work capacity during a prolonged flight (Psikhosomaticheskaiia samoregulatsiia - Effektivnyi metod podderzhaniiia rabotosposobnosti letchika v dlitel'nom polete).** S. G. Mel'nik and A. V. Shakula. *Voenno-Meditsinskii Zhurnal*, Apr. 1982, p. 47-50. 13 refs. In Russian.

Possibilities for the use of psychosomatic self-regulation as a technique for the correction of pilot work capacity over the course of a prolonged flight are examined. The method involves training in the attainment of a state of muscular relaxation, the development of abilities in voluntary vascular dilation, voluntary respiratory control, heart rate control and cerebral vascular control, as well as skills in autogenic activation. Laboratory simulations and experiments under actual flight conditions have shown the periodic performance of autogenic stimulation to improve pilot tracking performance and mental abilities over the course of a 6-hour flight, while slowing the decline in the condition of the visual analyzer, auditory discrimination, and hemispherical asymmetry, decreasing subjective fatigue and improving flight performance. Psychosomatic self regulation thus allows the in-flight self-correction of pilot physiological condition and work capacity related to the activation of the central nervous system under conditions of growing fatigue. A.L.W.

A82-33728 † **The prevention of dysadaptive changes in sailors at sea (Preduprezhdenie dizadaptivnykh izmenenii u moriakov v plavanii).** V. S. Novikov and V. N. Bortnovskii. *Voenno-Meditsinskii Zhurnal*, Apr. 1982, p. 50-52. 7 refs. In Russian.

Measures for the prevention of dysadaptive changes in immune status and physical condition were investigated in sailors over the course of a prolonged voyage. Immunobiological reactivity and physical work capacity were evaluated at the start, middle and conclusion of the voyage in 10 subjects undergoing periodic physical exercise, ultraviolet radiation exposure, vitamin C supplementation and electric sleep. Increases in leukocyte absorptive and digestive capacities and reductions in leukocytolysis and the microbial population of the skin indicative of positive changes in immunologic reactivity were found in the experimental group, while negative changes in these parameters were found in the controls. Decreases in exercise tolerance were observed in both groups, although by the end of the voyage tolerance was 14.3% higher in the experimental than in the control group. The combination of measures employed is thus recommended for increasing tolerance to adverse factors, maintaining work capacity and preventing the development of premorbid and pathological conditions. A.L.W.

A82-33749 **The roles of axes of symmetry in orientation illusions.** A. A. Hartley (Scripps College, Claremont, CA). *Perception and Psychophysics*, vol. 31, no. 4, Apr. 1982, p. 367-375. 22 refs.

The lines of a surrounding figure can induce illusory distortion in the apparent orientation of an enclosed line. The axes of symmetry of the figure have been implicated in this distortion. A series of experiments showed generally that the effects are attributable to the axes of bilateral symmetry rather than to less restrictively defined axes of topological symmetry, although those axes may produce other illusory effects. Furthermore, the distortions affect the whole line rather than only parts of it. These results are consistent with interactions of the

lines in the orientation rather than position domain. It is suggested that axes of symmetry may play an important role in pattern recognition. (Author)

A82-33751 **Man under vibration: Suffering and protection.** Edited by G. Bianchi (Milano, Politecnico, Milan, Italy), K. V. Frolov (Akademii Nauk SSSR, Institut Mashinovedeniia, Moscow, USSR), and A. Oledzki (Warszawa, Politechnika, Warsaw, Poland). Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers (Studies in Environmental Science. Volume 13), 1981. 451 p. \$74.50.

Among the topics discussed are the effects of muscle vibration and joint oscillation on human motor mechanisms, the immediate effect of vibrations transmitted to the hand, the determination of ankle joint muscle biomechanical characteristics by means of vibration tests, the dynamic modeling and vibratory response of human subjects in the heave mode, an anthropometric model of the human hand, and nonlinear effects connected with biomechanical system spatial vibrations. Also considered are an automatic system for the measurement of vibration parameters affecting the human body, the measurement of contact forces between the human body and mechanical equipment, kinematic-type, active vibroisolation devices, vibroisolation in portable tools, and the properties of nonlinear vibration protection systems with different dissipative characteristics. O.C.

A82-33752 **Modern problems of vibrations in the systems 'man-machine-environment'.** K. V. Frolov (Mechanical Engineering Research Institute, Moscow, USSR). In: *Man under vibration: Suffering and protection*. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 1-41. 42 refs.

The characteristics of vibrations to which human operators are subject in industrial production environments are described, and the mechanical and physiological responses of the human body to such vibrations are analyzed. Experimental studies of the dynamic characteristics of the body and arms of an operator show a significant change in the parameters of dynamic biomechanical system models, in connection with changes of position or degree of muscular tension. Attention is given to the instability of the human body's dynamic characteristics under long-term vibrational influence, and active-change modeling of the body's mechanical parameters is discussed. O.C.

A82-33753 **Effects of muscle vibration and joint oscillation on human motor mechanisms.** G. C. Agarwal (Illinois, University, Chicago, IL) and G. L. Gottlieb (Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL). In: *Man under vibration: Suffering and protection*. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN-Polish Scientific Publishers, 1981, p. 42-54. 31 refs. NSF Grant No. ENG-76-08754; Grants No. NIH-NS-12877; No. NIH-NS-00196.

The tonic vibration reflex (TVR) affects a joint's response to sinusoidal oscillation in the same facilitatory manner that is seen with tonic voluntary contraction. In contrast, tonic voluntary contraction facilitates the myotatic reflex while the TVR inhibits it in the soleus muscle. The degree of myotatic reflex inhibition is input frequency dependent. In discrete tracking task, vibration increases simple and choice reaction times. However, the error correction time is not influenced. (Author)

A82-33754 **Effect of base oscillations on the human skeletal muscle and joint forces in a standing posture.** A. Seireg and R. Arvikar (Wisconsin, University, Madison, WI). In: *Man under vibration: Suffering and protection*. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN-Polish Scientific Publishers, 1981, p. 55-64. 10 refs.

A comprehensive computer model of the musculoskeletal system is utilized in conjunction with published data on human response and tolerances to vibration for the calculation of the muscle forces and the stress variation at different base frequencies. The results show that the peak pressures on the spinal column are approximately the same as those calculated at the limit of the subject's weight lifting capability. (Author)

A82-33755 **Mechanoreceptor systems of the organism from the viewpoint of vibrational biomechanics.** A. S. Mirkin and S. V. Petukhov (Mechanical Engineering Research Institute, Moscow, USSR). In: *Man under vibration: Suffering and protection*. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 65-75. 13 refs.

A discussion is presented of results of biomechanical studies of vestibular apparatus and Pacinian-corporuscle mechanoreceptor systems subjected to vibration, with attention to the frequency characteristics of the latter. The importance of the 100 Hz frequency for both mechanoreceptor systems is noted, and a scale model of the human semicircular canal system, constructed on the basis of dynamical similarity theory, is described. The model establishes purely mechanical reasons for the entering of false vestibular information into the nervous system under the condition of low-frequency angular vibration of the head. O.C.

A82-33756 Immediate effects of vibration transmitted to the hand. H. Dupuis and G. Jansen (Mainz, Universität, Mainz, West Germany). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 76-86. 10 refs.

The biomechanical behavior of the hand-arm system is studied, with attention to its subjective sensations and physiological changes, under conditions of vibration transmitted to the hand by vibrating tools, machinery and work pieces. It is found that the wrist, and with less amplification the elbow, show resonances at 10-20 Hz. In addition, it is determined that subjective perception decreases with increasing frequency at constant acceleration, and that the application of static grip force in the absence of vibration causes significant skin temperature reduction although it remains at the same, lowered level under vibration stress. O.C.

A82-33757 Basic principles for hygienic rating of industrial whole-body vibration in the U.S.S.R. A. A. Menshov (Institut Gigieny Truda i Profzabolevani, Kiev, Ukrainian SSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 87-96. 10 refs.

It is noted that, despite resonance frequency similarities, the principles which are the bases of the USSR's hygienic rating for whole-body vibration encountered by industrial, agricultural and transportation workers differ from those of the International Standard ISO-2631. The Soviet rating is based on octave-band-measured vibrovelocity, in contrast to the vibroaccelerations of the International Standard. The experimental bases for vibrovelocity evaluation standards were established by Menshov (1971). Tabular data are presented on changes of physiological function due to vibration exposure. O.C.

A82-33758 Effects of vibrating tools on the peripheral vessels and the peripheral nervous system in workers of an iron foundry - Preventive suggestions. R. Gilioli, M. Tomasini, C. Bulgheroni, A. Grieco (Clinica del Lavoro, Milan, Italy), and F. Grazia (Istituto Neurologico, Milan, Italy). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 97-129. 6 refs.

Four task-related categories of risk, encompassing both peripheral angiological and neurological impairment, are determined by an investigation of the upper limbs of iron foundry workers using vibrating tools. A questionnaire was devised for the compilation of subjective symptoms, and objective signs of angiopathy were obtained through clinical observation and photoplethysmography in basal conditions and after the cooling of hands in running water. The risk categories are for the tasks of finishers, former finishers not exposed to the foundry vibration environment for a mean period of three years, mechanical molders, and manual molders. While finishers and former finishers were found to have sustained peripheral neurogenic lesions, both categories of molders had normal neurological characteristics. O.C.

A82-33759 Comparative analysis of human and subhuman operator performance in a control loop. P. K. Bhagat, V. N. Gupta, and D. F. McCoy (Kentucky, University, Lexington, KY). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 130-140.

A preprogrammable, electronic visual tracking facility was used in an attempt to compare the performance of human operators with that of three Rhesus monkeys which had been trained by means of electric shock negative reinforcement. A parameter-optimization algorithm was used to compute a five-parameter performance model with describing function data obtained under a compensatory tracking task, for the cases of the monkeys and of two human subjects. No significant differences between the two species are found in the results, with transportation lag ranging from 0.08 to 0.19 sec. The similarity in functional relationships between human and subhuman operators supports monkey-man extrapolations in stressful tracking situations. O.C.

A82-33760 The determination of the equivalent biomechanical characteristics of the ankle joint muscles by vibration tests. V. M. Zatsiorskii, A. S. Aruin, L. M. Raisin, and G. Ia. Panovko (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 166-175. 14 refs.

A method is developed for investigation of the biomechanical characteristics of lower extremity muscles, under conditions similar to natural ones, and values are determined for the equivalent damping coefficient and stiffness factor of human ankle joint muscles as a function of the force manifested. It is found through 2-70 Hz vibrating platform tests that, while muscle stiffness characteristics are lower than those calculated by means of damped oscillations, they are in agreement with the damping coefficient value. It is also determined that muscle stiffness increases with measured force. O.C.

A82-33761 Dynamic modeling and vibratory response of human subjects in heave mode. D. P. Garg (Duke University, Durham, NC). In: Man

under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 176-189. 22 refs.

A 16-mass, lumped-parameter dynamic model of human subjects which reproduces measured response peaks at various resonance frequencies and conforms adequately to experimental response curves at the remaining frequencies is described. It is shown by results that human vibration transmissibility may be measured in the 1-50 Hz frequency range. In addition, a linear lumped-parameter model which both accounts for human anatomy and matches average test frequency response in magnitude and phase angle can be derived. It is found that standing human subjects under vibratory input conditions exhibit four predominant peaks at approximately 2, 6, 20 and 33 Hz, with a resonance near 43 Hz due to head rotation. The model presented may be used for the prediction of human body responses to other types and combinations of inputs, along with the compilation of prosthetics-design data. O.C.

A82-33762 Some problems of identification and modelling of the human body. M. Ksiazek (Krakow, Politechnika, Krakow, Poland). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 200-209. 11 refs.

The modeling of the sitting human body when it is subjected to vertical harmonic vibration is undertaken by means of a procedure based on electric circuit theory. The possibilities and difficulties inherent in the application of mechanical impedance to the identification and modeling of the human body, when it is considered as a mechanical passive system, are also discussed. It is found that the two mechanical models of the sitting human body presented consist of dynamical, independent subsystems having the same structures. These subsystems may be taken to represent the head and spinal column and the trunk. O.C.

A82-33763 Non-linear effects connected with the spatial vibrations of biomechanical systems. B. A. Potemkin and K. V. Frolov (Mechanical Engineering Research Institute, Moscow, USSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 228-234. 9 refs.

The forced dynamic response of the human body under vibration is investigated through several simple classes of mechanical models, with attention given to that class of spatial models which permit the determination of detailed nonlinear effects due to the active and passive properties of biomechanical systems. The observed nonlinear phenomena are found to be more essential at high vibration amplitude, leading to their appearance at low excitation frequencies. It is concluded that human muscle activity under vibrational excitation is both specific and sensitive, vindicating the use of active biomechanical models for the case of low-frequency vibration. O.C.

A82-33764 Vibration defence of man - Questions of modeling. O. S. Naraikin and G. Ia. Panovko (Akademiia Nauk SSSR, Institut Mashinovedeniia, Moscow, USSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 235-246. 10 refs.

A classificatory scheme for methods used in the defense of the human body against vibration is presented, along with a discussion of experimental techniques for the determination of dynamic characteristics and the definition of mechanical models for the human body. A distributed parameter mechanical model is suggested, and model parameters are calculated. Head, shin, thigh and foot elements of the model are rigid, while the spinal column is represented by an elastic pivot. O.C.

A82-33765 Automatic system for study and measurement of vibration parameters affecting human body. V. V. Kliuev, V. A. Klochko, V. G. Gradetskii, D. A. Grechinskii, V. G. Rygalin, and Iu. V. Ivanov (Nauchno-Issledovatel'skii Institut Introskopi, Moscow, USSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 247-260.

An automatic system is proposed for the measurement of vibration process parameters affecting the human body. Detailed flowcharting of the system's software and hardware is given, showing the use of data input modules which control other modules, data acquisition modules for sampling and discretization of analog values, processing modules which conduct analyses of input data, control and rewrite modules, and data output modules which manage display units. The perspective afforded by the system described allows not only the prompt evaluation of vibration effects, but also the recommendation of improvements in vibration protection methods. O.C.

A82-33766 Critical assessment of common methods to determine vibrational stress of hand-arm system. P. Krause, A. Orban, K. J. Panzke, and K. Popov (Ministry of Building, Techno-Scientific Centre of Safety Engineering, East Germany). In: Man under vibration: Suffering and protection.

Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 261-274.

Common measuring method errors in the study of the hand-arm system are discussed. It is shown that contact and pressure forces must be taken into account, in addition to the time function of the mechanical vibrations applied. The extent to which hand-arm system vibrations propagate through soft and osseous tissue, as well as joints, is noted. It is recommended in light of this that correction factors depending on tissue size and thickness be given for measurements in which vibration pick-ups are attached to hand-arm system surfaces. O.C.

A82-33767 On the measuring of contact forces between human body and equipment. A. Oledzki (Warszawa, Politechnika, Warsaw, Poland). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 275-286.

Descriptions are given of the design and properties of three types of transducers used in the measurement of contact forces between the human body and mechanical equipment. All the transducers are applicable to dynamic measurement. A novel method is described for the measurement of contact forces which, although initially applied to static measurement, may also be used for the determination of the contact forces caused by vibrations. The conventionally used devices include miniature dynamometers, pneumatic gages, and electrokinetic transducers. O.C.

A82-33768 A survey of vibration control methods. A. Muszynska (Polska Akademia Nauk, Instytut Podstawowych Problemow Techniki, Warsaw, Poland). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 287-314.

Vibration control methods, involving automatic structural or parametric modifications by means of external power supplies with feedback control as well as simpler passive methods, are discussed. Attention is given to a mathematical model for the formulation of vibration control criteria, and to the dissipation of mechanical energy by radiation, internal or material damping, slip damping during flexural deformation, fluid pumping at joints, and the use of sandwich construction and antivibration mountings. It is noted that analysis and modification methods developed for industrial machinery-scale applications may be scaled down to sporting equipment or up to large civil, astronautical and marine engineering problems. O.C.

A82-33769 Optimization of stochastic man-machine systems. R. I. Furunzhiev and A. Ia. Ismailov (Belorusskii Politekhicheskii Institut, Minsk, Belorussian SSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 315-329. 15 refs.

The comparative efficiency of stochastic optimization methods in the design of stochastic machine systems is considered, in light of the performance of seven algorithms on problems of test functions, test models of stochastic vibratory systems, and models of wheeled vehicles employing a nonlinear vibration-isolation system for random disturbances. Emphasis is put on the comparative convergence time of the stochastic algorithms considered. Best results were obtained with the stochastic vibratory object method, which required five hours of computation time for the asymptotic optimization of a man-machine system. O.C.

A82-33770 Vibration machines and man. E. I. Shemiakin, N. P. Benevolenskaia, and A. Ia. Tishkov (Akademiia Nauk SSSR, Institut Gornogo Dela, Novosibirsk, USSR). In: Man under vibration: Suffering and protection. Amsterdam, Elsevier Scientific Publishing Co.; Warsaw, PWN - Polish Scientific Publishers, 1981, p. 348-352.

The effects of vibrating mining machinery employed in the Soviet Union on the human body is considered, with attention to trends in the mitigation of harmful vibration effects on human operators. Among the man-machine systems studied are electric mine locomotives, loading belts and conveyors and vibrating screens. The use of the traveling wave principle in vibrating machines is cited as a case of successful vibration reduction in mining machinery. O.C.

A82-33895 # Solar bacterial biomass farm for space vehicles. H. Tribsch (Berlin, Freie Universität, Berlin, West Germany). *Astronautics and Aeronautics*, vol. 20, June 1982, p. 66-68. 8 refs.

The use of the bacterium *Thiobacillus ferrooxidans* to produce biomass ten times as efficiently as the best agricultural land is discussed. A solution of Fe(2+), carbon dioxide from the air, and oxygen is all that the bacterium needs to grow and multiply and produce biomass at 35 percent efficiency. Depending on what process is used to manufacture the Fe(2+), the final efficiency would range from 6 to 17.7 percent, compared to the 1 percent efficiency of photosynthesis. A solar farm in space producing biomass by means of a continuous-flow apparatus is described. The bacterium has characteristics suitable for living in outer space: ability to grow in the dark, toleration of harsh living conditions, and resistance to radiation. C.D.

A82-33905 * # Studies of planning behavior of aircraft pilots in normal, abnormal, and emergency situations. G. Johannsen, W. B. Rouse, and K. Hillmann. Research supported by NASA; Grants No. NSG-2119; No. NAG2-123. Wachtberg-Werthhoven, West Germany, Forschungsgesellschaft für angewandte Naturwissenschaften, Forschungsinstitut für Anthropotechnik (Forschungsinstitut für Anthropotechnik, Bericht, No. 53), 1981. 91 p. 17 refs. In English and German. \$4.10.

A methodology for the study of human planning behavior in complex dynamic systems is presented and applied to the study of aircraft pilot behavior in normal, abnormal and emergency situations. The method measures the depth of planning, that is the level of detail employed with respect to a specific task, according to responses to a verbal questionnaire, and compares planning depth with variables relating to time, task criticality and the probability of increased task difficulty. In two series of experiments, depth of planning was measured on a five- or ten-point scale during various phases of flight in a HFB-320 simulator under normal flight conditions, abnormal scenarios involving temporary runway closure due to snow removal or temporary CAT-III conditions due to a dense fog, and emergency scenarios involving engine shut-down or hydraulic pressure loss. Results reveal a dichotomy between event-driven and time-driven planning, different effects of automation in abnormal and emergency scenarios and a low correlation between depth of planning and workload or flight performance. A.L.W.

A82-33909 # Working in space. G. V. Butler and H. L. Wolbers (McDonnell Douglas Astronautics Co., Huntington Beach, CA). *AIAA Student Journal*, vol. 19, Fall 1981, p. 2-9, 47.

Aspects of the history, current status and future plans for humans working in space are discussed. Following a brief outline of the development of manned space flight, the facilities on board the Skylab orbital station are described, and experience gained in spacecraft maintenance and repair as well as the testing of a manned maneuvering unit and the operation of scientific experiments on Skylab is related. The potentials of the reusable Space Transportation System are then discussed in relation to the benefits that the transport of persons with a variety of talents may have for various world problems. Changes in the nature of the tasks to be performed as space missions evolve from short sorties to permanent installations supporting a large work force, as exemplified by the proposed Space Operations Center are then considered, with particular attention given to crew work schedules and space construction activities. It is concluded that almost any task that man can perform on the ground can also be performed in space, provided adequate tools and positioning restraints are used. A.L.W.

A82-33910 # Sociological aspects of permanent manned occupancy of space. B. J. Bluth (California State University, Northridge, CA). *AIAA Student Journal*, vol. 19, Fall 1981, p. 11-15, 48.

Potential difficulties in group dynamics which may occur in long-term space habitation by a large group, such as the crew envisioned for the Space Operations Center, are discussed. Previous studies of the social aspects of small groups in confined, isolated and stressful environments, including Antarctic stations, oceanographic research vessels, submarines, undersea laboratories and space simulators are reviewed, and Soviet experience with extended-duration space missions is considered. It is pointed out that in none of these experiences did prior evaluations predict the observed difficulties in adjustment, which included interpersonal hostility, hostility towards the ground crew, boredom, depression and exhaustion. The nature and possible means of relieving the principle sources of stress to be encountered in a long-duration space mission are then discussed, with particular attention given to conflicting social functions, group size, group composition, group organization, scheduling and architectural factors. A.L.W.

A82-34247 Studies on the property and transplantation of haemopoietic stem cells from peripheral blood. Z. Wu, S. Shen, A. Zhu, H. Xue, C. Yan, and R. Zhu (Academy of Military Medical Sciences, Institute of Radiation Medicine, Beijing, People's Republic of China). *Scientia Sinica*, vol. 24, Sept. 1981, p. 1302-1312. 17 refs.

Comparative studies of the properties of murine hemopoietic stem cells from different sources revealed that the peripheral hemopoietic stem cell is relatively weaker than the hemopoietic stem cell from bone marrow in promoting the recovery of hemopoiesis in irradiated animals. This is due to the heterogeneity of the stem cell population in which some aged cell subpopulations are coexisting. The modified potential in proliferation and differentiation of hemopoietic stem cells in the peripheral blood seems to be irreversible under normal physiological conditions. In a preliminary experiment, the use of an antithymocyte immunoglobulin to eliminate immunocompetent cells proved effective in reducing the severity and incidence of secondary diseases and in increasing the number of survivors of lethally irradiated semi-isologous mice after transplantation of parental peripheral mononuclear cells. (Author)

A82-34473 † Significance of the rehydration rate of the inner ear in the choice of method of surgical intervention in the endolymphatic system in Meniere's disease (Znachenie skorosti regidratatsii vnutrennego ukha v

vybore metoda khirurgicheskogo vmeshatel'stva na endolimfaticheskoi sisteme pri bolezni Men'era). V. T. Pal'chun, V. I. Aslamazova, T. S. Poliakova, and M. I. Kadyanova (II Moskovskii Meditsinskii Institut, Moscow, USSR). *Vestnik Otorinolaringologii*, May-June 1982, p. 30-34. 17 refs. In Russian.

A82-34474 † A caloric vestibular test using air (Kaloricheskaya vestibuliarnaya proba s ispol'zovaniem vozdukh). Iu. O. Bulaev and V. V. Vishniakov (II Moskovskii Meditsinskii Institut, Moscow, USSR). *Vestnik Otorinolaringologii*, May-June 1982, p. 36-39. 14 refs. In Russian.

A comparative study is presented of the parameters of the nystagmus reaction induced by the use of air and water for the caloric stimulation of the labyrinths. Air calorization was performed using air at temperatures of 24 and 50 C and a flow rate of 4 l/min in healthy subjects along with calorization by the Hallpike method with water at 30 and 44 C. Results of electro-nystagmography indicate the fundamental characteristics of nystagmus during air and water calorization to differ insignificantly although the latent period for air calorization was more prolonged. An asymmetry in labyrinthine excitability is also observed, corresponding to values of 12.1% for water calorization and 22.0% for the procedure using air. It is concluded that air calorization has a potential for wide clinical applications provided certain methodological factors are taken into account. A.L.W.

A82-34475 † Hormone levels in the blood of patients with Meniere's disease and cochleovestibulopathies (Soderzhanie gormonov v krvi bol'nykh s bolezni'u Men'era i kokhleovestibulopatiel). O. A. Buianovskaya, V. V. Potemkin, and G. N. Gudukina (II Moskovskii Meditsinskii Institut, Moscow, USSR). *Vestnik Otorinolaringologii*, May-June 1982, p. 40-44. 16 refs. In Russian.

A82-34676 † Effects of traumatic shock on cytogenetic processes in the epithelial cells of the cornea and tongue and the bone marrow cells of albino rats (Vlianie travmaticheskogo shoka na tsitogeneticheskie protsessy v kletkakh epiteliia rogovitsy i lyazya i v kletkakh kostnogo mozga belykh kry). G. M. Kalivetskaya, S. S. Timoshin, A. L. Lykov, and N. B. Murzina (Khabarovskii Meditsinskii Institut, Khabarovsk, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 92-94. 15 refs. In Russian.

A82-34677 † Dynamics of changes in the prostaglandin content of the brain tissue under cervical sympathectomy and circulatory hypoxia (Dinamika izmeneniia soderzhanii prostaglandinov v tkani mozga pri verkhneshheinoi simpatetomii i tsirkulatornoi gipoksii). L. V. Govorova, A. G. Kucherenko, Kh. M. Markov, Sh. S. Tashaev, and S. I. Teplov (Leningradskii Neirokhirurgicheskii Institut, Leningrad; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 3-6. 15 refs. In Russian.

A82-34678 † Features of the reaction of the blood serum of a healthy person with epidermis (Osobennosti reaktsii syvorotki krovi zdorovogo cheloveka s epidermisom). E. V. Gnezditskaya and L. V. Beletskaya (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 68-70. 123. 14 refs. In Russian.

Indirect immunofluorescence (performed on 70 healthy subjects) has shown that the blood serum of healthy subjects reacts with cytoplasmic antigens of epidermis differentiated cells (EDCs) in 100% of the cases. The level of antibodies and the immunomorphological picture of the reaction are characterized by high constancy and intense fluorescence of EDCs, while the reaction with basal layer cell antigens is observed comparatively rarely and is not pronounced. Attention is given to the possible role of antibodies in the blood serum and to the role of their complexes with tissue antigens in the regulation of the vital activity of the cells and the immune response to the host antigens. B.J.

A82-34679 † Effect of thymalin on the system of cyclic nucleotides in the mouse spleen (Vlianie timalina na sistemu tsiklicheskhkh nukleotidov v slezenke myshei). I. S. Gavrilenko, V. Kh. Khavinson, V. G. Morozov, and Iu. Iu. Ivinskii (Voenno-Meditsinskaya Akademiia, Leningrad, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 39, 40. 8 refs. In Russian.

A82-34680 † Comparative study of the gas-transport characteristics of models of an extraerythrocytic oxygen carrier (Sravnitel'noe izuchenie gazotransportnykh kharakteristik modelei vneeritrotsitarnogo perenoschika kisloroda). A. A. Khachatryan, E. P. Viazova, M. A. Azhigirova, A. M. Zeinalov, L. F. Fetisova, and G. Ia. Rozenberg (Tsentral'nyi Nauchno-Issledovatel'skii Institut Gematologii i Perelivaniia Krovi, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 28-30. 9 refs. In Russian.

It is shown that the coupling of the 2,3-DPH functional analog, pyridoxal-5'-phosphate (PP) to hemoglobin (Hb) and its polymer (HbP) makes it possible to obtain an artificial oxygen carrier with gas-transport characteristics similar to those of freshly prepared donor's blood. The coupling of PP to Hb and HbP intensifies their interaction with other physiologically important ligands (H⁺ and CO₂) and changes the pattern of the relation of P50 to the hemoprotein concentration in a solution. B.J.

A82-34681 † Glyceroaldehyde phosphatedehydrogenase from human muscles in atherosclerosis (Glitseral'degidfosfatdehidrogenaza iz myshts cheloveka pri ateroskleroze). F. N. Gil'miurova and N. N. Postnikova (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 26, 27. In Russian.

Glyceroaldehyde phosphatedehydrogenase (GP) was isolated from human skeletal muscles during autopsies on cadavers with atherosclerosis and from cadavers (serving as a control) without this ailment. The crystallized enzyme was found to be electrophoretically homogeneous in polyacrylamide gel. The specific activity of GP was 1.8 ± 0.2 and 2.7 ± 0.2 micromol NADN/mg min in the absence and presence of atherosclerosis, respectively. B.J.

A82-34682 † Lipid peroxidation and retinal damage under stress (Perekisnoe okislenie lipidov i povrezhdenie setchatki pri stresse). A. A. Shvedova, V. E. Kagan, I. Ia. Kuliev, S. K. Dobrina, L. L. Prilipko, F. Z. Meerson, and Iu. P. Kozlov (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moskovskii Gosudarstvennyi Universitet; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 24-26. 14 refs. In Russian.

It is shown that in rats exposed to emotional and pain stress, the electrical activity of the retina is inhibited as manifested in a decrease of the magnitude of electroretinogram waves. At the same time, lipid-peroxidation products accumulate and the content of the natural antioxidant alpha-tocopherol decreases in the retina. It is found that preliminary administration of synthetic antioxidants (4-methyl-2,6-ditertbutylphenol, OP-6 belonging to the hydroxypyridine series) prevents the accumulation of lipid-peroxidation products and protects the electrical activity of the retina. B.J.

A82-34683 † Microcirculation and oxygen tension in the rat brain cortex during hemorrhagic shock (Mikrotsirkulatsiia i napriazhenie kisloroda v kore golovnogo mozga kry. V. I. Udovichenko and Iu. M. Shtykho (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 8, 9. In Russian.

A82-34684 † Regulation of the functional activity of stem cells which are the precursors of granulomonopoiesis by polypeptide thymic and bone marrow factors (Regulatsiia funktsional'noi aktivnosti stvolovykh kletok-predshestvennikov granulomonopoeza polipeptidnymi faktorami timusa i kostnogo mozga). L. V. Filev, V. Kh. Khavinson, and V. G. Morozov (Voenno-Meditsinskaya Akademiia, Leningrad, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 94, 95. 12 refs. In Russian.

A82-34685 † The effect of repeated sublethal overheating on cytogenetic processes in the epithelium of the cornea and in bone marrow cells in white rats (Vlianie mnogokratnogo subletal'nogo peregrevaniia na tsitogeneticheskie protsessy v epiteli rogovitsy i kletkakh kostnogo mozga belykh kry). M. I. Radivoz, S. S. Timoshin, A. P. Baranov, and N. B. Murzina (Khabarovskii Meditsinskii Institut, Khabarovsk, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 98-100. 10 refs. In Russian.

A82-34686 † Distribution of nucleolar nucleic acids in Purkinje cells under vestibular stimulation and immobilization of rats (Raspredelenie kolichestv iadryshkovykh nukleinovyykh kislot v kletkakh Purkin'e pri vestibuliarnoi stimulatsii i immobilizatsii kry). Z. A. Mikeladze (Tbilisskii Gosudarstvennyi Universitet, Tbilisi, Georgian SSR) and V. Ia. Brodskii (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 105-108. 5 refs. In Russian.

A82-34687 † Ultracytochemical changes in the brain and liver under the influence of low-intensity nonionizing microwave radiation (Ul'trasitokhimicheskie izmeneniia v golovnom mozge i pecheni pri deistvii neioniziruiushchikh mikrovolnovykh izlucheniia maloi intensivnosti). V. S. Belokrinitskii, L. A. Tomashevskaya, and G. I. Konobeeva (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 112-116. 11 refs. In Russian.

Ultrastructural and metabolic changes in brain and liver cells provoked by repeated exposure to low-intensity nonionizing radiation are investigated. Morphological, histochemical, and biochemical studies were performed on cells from 478 albino rats having undergone daily microwave irradiation at intensities of 50 and 10 microwatt/cm for up to 2 months. Comparisons with intact animals and with animals exposed to simulated altitude and high doses of microwave radiation alter the structural and functional bases for the regulation of metabolic processes; conformational changes in biologically active compounds are induced, thus damaging the fine structures of the cell, and the patterns of energy production are changed, with an uncoupling of mitochondrial oxidative phosphorylation and an increase in glycolysis at the expense of synthesis. Resistance to hypoxia and the effects of higher doses of radiation are also increased. A.L.W.

A82-34688 † **An autoradiographic and electron-microscope experimental study of the effect on wound healing of various Soviet dressings (Avtoradiograficheskoe i elektronnomikoposkopicheskoe issledovanie vliianiia nekotorykh otechestvennykh pereviazochnykh materialov na zashivlenie ran v eksperimente).** G. N. Dudnikova, T. T. Daurova, and I. B. Rozanova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Apr. 1982, p. 116-118. 7 refs. In Russian.

A82-34689 † **The level of group development as a factor influencing the relation between group size and successfulness (Uroven' razvitiia gruppy kak faktor, vliiaushchii na vzaimosviaz' ee velichiny i uspekhnosti).** R. S. Nemov and A. Ia. Galvanovskis. *Voprosy Psikhologii*, Mar.-Apr. 1982, p. 103-108. 22 refs. In Russian.

Previous studies have produced contradictory data concerning the relation of group size with group success whether measured in terms of individual contributions, productivity or satisfaction. The present study seeks to explain these contradictions in terms of the influence of the social and psychological development of the group. Evaluations of group development and successfulness according to the three criteria indicated were performed for 38 groups of schoolchildren containing four to seven members each. In groups exhibiting high and moderate levels of development, task efficiency, the average individual contribution and member satisfaction are found to be independent of group size, while in groups with low levels of development and in randomly assembled groups, a statistically significant correlation is obtained between these factors. A.L.W.

A82-34690 † **The direction of the process of computer operator training (Upravlenie protsessom obucheniia operatorov EVM).** I. K. Valovaia. *Voprosy Psikhologii*, Mar.-Apr. 1982, p. 115-121. 7 refs. In Russian.

The psychological characteristics of computer operator activity and the factors influencing the learning of this activity are studied to aid in the direction of the education of computer operators. Experiments were conducted to determine the characteristics of the processing of a standard set of information in which it is necessary to distinguish signals contained in the information under various mental workloads, the characteristics of the improvement in the speed and accuracy of information processing and the changes in the rate of information processing brought about by mental workloads and fatigue in male and female students converting an informational program into punched cards. Results are used to derive a model of the training process which may be used to monitor progress in mastering skills, and predict individual patterns of skill acquisition and the degree of mental fatigue encountered when working with test problems of varying complexity. A.L.W.

A82-34691 † **Test for the study of the efficiency of the tactile-motor analyzer (Test dlia issledovaniia rabotosposobnosti taktil'no-motornogo analizatora).** A. S. Lukauskas, V. B. Obelianis, and Iu. P. Rauba. *Voprosy Psikhologii*, Mar.-Apr. 1982, p. 130-132. In Russian.

A method is presented which allows the assessment of the functional condition of the central nervous system through the measurement of tactile-motor efficiency. The test involves the manual separation of differently textured objects of the same size on the basis of their textures alone without the use of visual clues. Results are tabulated in terms of the time required, the number of errors, and the information processing rate in bits per second. The method is particularly useful in the workplace, and for the evaluation of the visually handicapped. A.L.W.

A82-34693 † **The efficiency of the training of young athletes when vitamins and trace elements are included in their diet (Effektivnost' trenirovki iunykh atletov pri vkluchenii v ratsion vitaminnykh i mikroelementnykh dobavok).** V. Ia. Rusin, V. V. Nasolodin, and I. P. Gladkikh (Iaroslavskii Gosudarstvennyi Pedagogicheskii Institut; Iaroslavskii Gosudarstvennyi Universitet, Yaroslavl, USSR). *Gigiena i Sanitariia*, Mar. 1982, p. 78-80. 11 refs. In Russian.

A82-34694 † **A hygienic assessment of the possibility of using 1,3-dichloro-5,5-dimethylhydantoin for disinfecting drinking water (Gigienicheskaiia otsenka vozmozhnosti primeneniia 1,3-dikhlor-5,5-dimetilgidantoina dlia tselei obezrazhivaniia pit'evoi vody).** A. A. Semenova and A. A. Korolev (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Gigiena i Sanitariia*, Mar. 1982, p. 11-13. In Russian.

A82-34695 † **Space biology and medicine (Kosmicheskaiia biologii i meditsina).** E. I. Vorob'ev (Ministerstvo Zdravookhraneniia SSSR, Moscow, USSR) and A. R. Kotovskaia. *Zemlia i Vselennaia*, Mar.-Apr. 1982, p. 32-35. In Russian.

Activities in the fields of space biology and medicine conducted within the framework of the Intercosmos program are discussed. Early experiments conducted to demonstrate the possibility of surviving in a weightless environment are indicated, and the results of biological experiments flown on Cosmos biosatellites are outlined which demonstrated the effects of weightlessness on muscular and

bone tissues and the possibility of counteracting these effects by the use of centrifuge-generated artificial gravity. Medical experiments performed during nine international manned space flights are then discussed with particular attention given to devices used in studies of the cardiovascular and respiratory systems, auditory and gustatory perception, the prevention of changes in leg muscular and supportive functions, motion sickness drugs, psychological effects, mental work capacity and the prevention of mood deterioration during the acute phase of adaptation to space flight conditions. A.L.W.

A82-34696 † **The organism and magnetic fields (Organizm i magnitnye polia).** Iu. A. Kholodov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatelnosti, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 13, Apr.-June 1982, p. 48-64. 117 refs. In Russian.

Current knowledge concerning the biological effects and generation of magnetic fields is reviewed. Following a classification of magnetocytobionics, into the areas of magnetobiology, biomagnetism and the magnetic control of biosystems, the biotropic parameters of magnetic fields are examined, with particular attention given to induction, gradient, vector, frequency, pulse shape, exposure and localization. Characteristics of the organism affecting its response to a magnetic field, including age, sex, individual differences, and the tissues affected, are considered, and the temporal characteristics, localization and actual nature of the reaction of an organism to a magnetic field are examined, with particular attention given to the general readjustment reaction and the slow initial reaction. Data from the recording of the magnetic fields of the human heart and brain is also presented, and possible physical and chemical mechanisms for the biological effects of magnetic fields are discussed. A.L.W.

A82-34697 † **The nervous regulation of the liquid state of the blood and its coagulation (Nervnaia regulatsiia zhidkogo sostoiianiia krovi i ee svertyvaniia).** T. M. Kalishevskaiia and M. G. Golubeva (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 13, Apr.-June 1982, p. 93-122. 160 refs. In Russian.

The paper reviews the current state of knowledge concerning the neuro-humoral regulation of blood coagulation and the maintenance of the blood in a liquid state in the whole organism. The classical enzymatic theory of blood coagulation is outlined, however it is noted that the sequence of biochemical reactions identified with the coagulation process does not take into account the influence of the organism itself. The nature and functioning of blood anticoagulants in the regulation of the liquid state of the blood is then examined, and vascular bed chemoreception is discussed as the fundamental physiological mechanism controlling the blood coagulant and anticoagulant systems according to thrombin and plasmin levels. Experimental data concerning the role of central brain structures and the sympathetic and parasympathetic nervous systems in the regulation of the blood coagulation system is then discussed with particular emphasis on the role of the hypothalamus as the locus of the interaction of regulatory mechanisms. A.L.W.

A82-34698 † **The prognostic value of the glucose tolerance test (Prognosticheskoe znachenie proby na tolerantnost' k gliukoze).** V. G. Baranov, A. M. Sitnikova, and L. I. Konradi (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Kazanskii Meditsinskii Zhurnal*, vol. 63, Jan.-Feb. 1982, p. 18, 19. 7 refs. In Russian.

Characteristics of a normal glucose tolerance test most predictive of the future development of diabetes mellitus and other disturbances in glucose tolerance were studied on the basis of a retrospective study of 564 women with initially normal glucose tolerance. Comparison of the results of a second glucose tolerance test conducted 2 months to 16 years following a first test with those of the first reveals 33.8% of the subjects to have developed disturbances in glucose tolerance (25.7% of the questionable type and 8.1% of the diabetic type). Analysis of the results of the first examination of the three groups identified reveals that, while all values of blood glucose levels were within the normal range, those observed subsequently to have impaired tolerances tended to exhibit higher levels following glucose loading in the first test. It is concluded that glycemic of 7.8 to 9.9 mmole/l 1 hour following glucose loading and 6.1 to 7.2 mmole/l 2 hours after loading are each indicative of an increased risk of diabetes mellitus. A.L.W.

A82-34768 **The effect of millimeter-wave electromagnetic radiation on biological structures and organisms of varying complexity (Vozdeistvie elektromagnitnykh kolebanií millimetrovogo diapazona dlin voln na biologicheskie struktury i organizmy razlichnoi slozhnosti).** N. D. Deviatkov, O. V. Betskii, E. A. Gel'vich, M. B. Golant, T. B. Rebrova, L. A. Sevastianova, and A. Z. Smolianskaia (Akademiia Nauk SSSR, Institut Radiotekhniki i Elektroniki, Moscow, USSR). In: *Electromagnetic compatibility 1980; Proceedings of the Fifth International Wrocław Symposium and Exhibition, Wrocław, Poland, September 17-19, 1980. Part 2.* Wrocław, Wydawnictwo Politechniki Wrocławskiej, 1980, p. 561-570. 15 refs. In Russian.

The paper examines the main features of the effect of millimeter-wave radiation on biological objects at the molecular, cellular, and organism level. The dependence of the interaction on irradiation time and on the irradiation power density

A82-34830

is investigated for the following biological objects: hemoglobin and erythrocytes in human blood, the *E. coli* bacillus, golden staphylococcus, mold and fungus, and mice and rats. Millimeter-wave radiation is found to have a powerful resonant effect on the development and activity of biological objects; this effect is observed at various frequencies with an irradiation power density of several mW/sq cm.
B.J.

A82-34830 **Reconstruction of spatial information in the human visual system.** G. Nyman and P. Laurinen (Helsinki, University, Helsinki, Finland). *Nature*, vol. 297, May 27, 1982, p. 324, 325. 9 refs.

In the considered psychophysical context, the term 'reconstruct' refers to the observer's ability to perceive certain predetermined spatial features, such as waveform or spatial frequency, in a stimulus consisting of spatial samples of a grating of particular waveform and spatial frequency. Psychophysical measurements were conducted regarding the number of samples per spatial cycle needed to recognize sinusoidal and square-wave gratings. The obtained results are expressed in terms of sampling efficiency, which relates the measured threshold sampling rate to the Shannon-Whittaker or Nyquist limit of the grating frequency which was studied. The results contradict the models which describe the visual system as a Fourier analyzer in which a complex waveform is recognized on the basis of the information obtained from its harmonics, each of which is channelled through its own spatial frequency selective channel.
G.R.

A82-34831 **Local cerebral glucose utilization in non-rapid eye movement sleep.** C. Kennedy (U.S. Public Health Service, Laboratory for Cerebral Metabolism, Bethesda, MD; Georgetown University, Washington, DC), J. C. Gillin, W. Mendelson, S. Suda, M. Miyaoka, M. Ito, R. K. Nakamura, F. I. Storch, K. Pettigrew, and M. Mishkin (U.S. Public Health Service, Department of Health and Human Services, Bethesda, MD). *Nature*, vol. 297, May 27, 1982, p. 325-327. 9 refs.

Sleep is accompanied by alterations in neurophysiological activity in many discrete regions in the brain. Such alterations could be expected to be accompanied by corresponding changes in local metabolic rate. The specific regions involved in sleep, at least in the stages other than rapid eye movement (REM) sleep, have now been searched for by using the (2-(C-14)) deoxyglucose method for measuring local cerebral glucose utilization in the rhesus monkey. Contrary to what many have predicted, animals during stages 2-4 of sleep exhibited a nonselective, generalized 30% decrease in cerebral metabolic rate. Of the 75 structures measured, none exhibited a higher rate in non-REM sleep than in wakefulness.
(Author)

A82-34834 **A computational model of binocular depth perception.** J. E. W. Mayhew (Sheffield, University, Sheffield, England) and H. C. Longuet-Higgins (Sussex, University, Brighton, England). *Nature*, vol. 297, June 3, 1982, p. 376-378. 14 refs.

It is pointed out that the horizontal disparities between a pair of retinal images are inadequate for computing the three-dimensional structure of a scene unless supplemented by independent information about the distance and direction of the fixation point. It is suggested that this supplementary information is derived not from nonvisual sources, but from the vertical disparities of a few nonmeridional image points. This hypothesis is shown to account quantitatively for Ogle's induced effect - the marked distortion of a scene by a vertically magnifying lens placed in front of one eye.
(Author)

A82-34917 **† Magnetic-field effect on photophysical processes in the light-harvesting pigment apparatus of purple photosynthetic bacteria (Vliianie magnitnogo polia na fotofizicheskie protsessy v svetosobiraiushchem pigmentnom apparate purpurnykh fotosinteziruiushchikh bakterii).** E. I. Elfimov, V. M. Vozniak, and I. R. Prokhorenko (Akademiia Nauk SSSR, Institut Fotosinteza, Pushchino, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 264, no. 1, 1982, p. 248-252. 15 refs. In Russian.

STAR ENTRIES

N82-24258# Joint Publications Research Service, Arlington, Va.

PSYCHOLOGICAL ASPECTS OF AEROSPACE ORIENTATION

Avn G. Beregovoy *In its USSR Rept.: Space*, No. 15 (JPRS-80424) 29 Mar. 1982 p 45-49 Transl. into ENGLISH from *Aviats. Kosmonavt. (USSR)*, no. 10, Oct. 1981 p 34-35

Avail: NTIS HC A07/MF A01

The practical experience of cosmonauts on the ground and analysis of their activities during space flight is discussed. It is evidenced that control accuracy and precision in decision making by spacecraft commanders, especially in nonprogrammed situations, depend to a great extent on their experience as a pilot. Piloting a space vehicle has features which are peculiar to it alone. Nonetheless, the differences between space flight and the flight of an aircraft in the atmosphere seem fundamental only at first glance. It is concluded that spacecraft flight and aircraft flight have quite a lot in common, primarily as related to spatial orientation in the atmosphere and in space. E.A.K.

N82-24806 Joint Publications Research Service, Arlington, Va. **USSR REPORT. LIFE SCIENCES: BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 14**

28 Jan. 1982 89 p refs Transl. into ENGLISH from various Russian articles

(JPRS-79973) Copyright. Avail: Issuing Activity

Changes in central nervous system cells caused by the reproduction of arboviruses, pigskin grafts for burn treatment, the role of aviation physicians, the use of magnetic fields in biology and medicine, and cellular processes observed in the recovery from acute radiation sickness are discussed.

N82-24807 Joint Publications Research Service, Arlington, Va. **ULTRASTRUCTURAL CHANGES IN CENTRAL NERVOUS SYSTEM CELLS INDUCED BY ARBOVIRUSES**

B. A. Yerman and N. Ya. Pashnina *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 14 (JPRS-79973) 28 Jan. 1982 p 1-11 refs Transl. into ENGLISH from *Ark. Patol. (USSR)*, v. 43, no. 9, Sep. 1981 p 72-78

Copyright. Avail: Issuing Activity

Changes observed in animal central nervous system cells due to the reproduction of tick-borne encephalitis arboviruses are described. The disappearance of the rough endoplasmic reticulum, cellular ribosomes, and polysomes in nerve and glial cells, and hyperplasia and hypertrophy of the smooth membranes of the lamellar complex and endoplasmic reticulum with dilatation of cisternae and canals was observed. The grouping of smooth membranes and the appearance on the membranes of nucleoid centers are characteristic. The appearance of vesicles in the cytoplasmic matrix and cisternae of endoplasmic reticulum was observed. Sites where mature virions and alphavirus and flavivirus nucleoids are located and identified. Other changes typical for each pathogen are described. J.D.

N82-24808 Joint Publications Research Service, Arlington, Va. **PIGSKIN XENOGRAPHS IN TREATMENT OF PATIENTS WITH EXTENSIVE BURNS**

V. K. Sologub, M. I. Dolgina, D. A. Donetskiy, S. S. Morozov, V. G. Borisov, Z. G. Goncharova, and G. G. Serov *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 14 (JPRS-79973) 28 Jan. 1982 p 36-39 refs Transl. into ENGLISH from *Khirurgiya (Moscow)*, no. 5, May 1980 p 14-16

Copyright. Avail: Issuing Activity

The use of pigskin xenografts for the treatment of severe burns is evaluated. Clinical observations of the treatment of 60 patients having deep burns over 10 to 70% of their bodies

are described. The burns were covered with preserved skin grafts of both allogenic and xenogenic origin. An improvement in neurological and psychological status, the reduction of heat, water, protein, and electrolyte losses, and the prevention of anemia and of microfloral invasion of the wound and were observed. J.D.

N82-24809 Joint Publications Research Service, Arlington, Va. **SUPPORT ROLE OF AVIATION PHYSICIANS**

I. Alpatov *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 14 (JPRS-79973) 28 Jan. 1982 p 40-42 Transl. into ENGLISH from *Grazhdanskaya Aviats. (Moscow)*, no. 6, Jun. 1981 p 24

Copyright. Avail: Issuing Activity

The changing role of aviation physicians in maintaining and evaluating the health of flight personnel is discussed, with particular emphasis on the sociopsychological aspects of health care. J.D.

N82-24810 Joint Publications Research Service, Arlington, Va. **BIOTROPIC PARAMETERS OF MAGNETIC FIELDS**

M. A. Shishlo *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 14 (JPRS-79973) 28 Jan. 1982 p 47-50 refs Transl. into ENGLISH from *Vopr. Kurortol., Fizioterapii i Lecheb. Fiz. Kult. (Moscow)*, no. 3, May - Jun. 1981 p 61-63

Copyright. Avail: Issuing Activity

The use of magnetic fields in biology and medicine for the control of biological systems is discussed. Biotropic parameters of magnetic fields, including intensity, gradient, vector, pulse frequency and shape, and duration of exposure are described. Units of measurement are given, and terminology is discussed. J.D.

N82-24811 Joint Publications Research Service, Arlington, Va. **POSTRADIATION RECOVERY OF HUMAN BONE MARROW AND MORPHOLOGICAL DYNAMICS OF UNDIFFERENTIATED CELL POOL**

L. A. Suvorova, N. A. Vyalova, A. V. Barabanova, and G. P. Gruzdev *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 14 (JPRS-79973) 28 Jan. 1982 p 55-62 refs Transl. into ENGLISH from *Terapevt. Arkh. (Moscow)*, v. 53, no. 9, Sep. 1981 p 127-131

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The postirradiation repair of the hemopoietic function in human beings and of changes observed in bone marrow and peripheral blood is described. The processes of damage and recovery of bone marrow from acute radiation sickness induced by external radiation are described, based on observations of 77 samples made from the first to the forty-third day after irradiation. J.D.

N82-24812# California Univ., Irvine. Dept. of Development and Cell Biology.

DEVELOPMENT OF GUAYULE (PARTHENIUM ARGENTATUM) Final Report

Ernest A. Ball 2 Jan. 1981 14 p refs

(Contracts NAS7-100; JPL-954955)

(NASA-CR-168926; JPL-9950-477; NAS 1.26:168926;

UCI-59913) Avail: NTIS HC A02/MF A01 CSCL 06C

The cytokinin benzylaminopurine strongly stimulated shoot growth, and the number of regenerated buds on the inoculum was proportional to its concentration. These buds produced shoots several centimeters in length which were caused to root on medium containing indolebutyric acid. Transferred to the septic condition of soil, the plantlets were gradually brought into full sunlight where they showed a brief vegetative growth with production of mature type leaves, and flowered. In contrast, seedlings of the same age remained vegetative. Chromosome studies of root smears from the tissue cultured plantlets showed that $2n = 36$, the normal number for sexually reproducing guayules. Author

N82-24813# Committee on Science and Technology (U. S. House).

THE USE OF ANIMALS IN MEDICAL RESEARCH AND TESTING

Washington GPO 1982 752 p refs Hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 68, 13-14 Oct. 1981

(GPO-87-598) Avail: Subcommittee on Science, Research and Technology

The use of animals in medical research is discussed. Abundant evidence is cited for the view that the research involving animals is beneficial for humans. Other evidence is presented that supports the view that alternative research methods could be employed. Criticism is aimed at the poor care that the animals receive and at the unnecessary suffering they experience. The ethics and morals of animal experimentation are considered. The text of House Resolution 556, a pending bill calling for the establishment of a national center for alternative research is given. R.J.F.

N82-24814# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

EVALUATION OF IMMUNOLOGICAL METHODS FOR TOXICITY STUDIES IN ANIMALS: INHALATION STUDIES WITH BENZENE AND HALOTHANE IN RATS

L. M. Appelman (Inst. Toxicology and Nutrition, Utrecht), O. Brocades Zaalberg, J. L. F. Gerbrandy, Frieke Kuper, and D. deRijke (Inst. Toxicology and Nutrition, Utrecht) Mar. 1980 127 p refs

(MBL-1980-4; CIVO-R-6506; TDCK-75132) Avail: NTIS HC A07/MF A01

The sensitivity of the immune system as a criterion for detecting harmfulness of inhaled substances was investigated. Immunological and toxicological data from tests in which rats were exposed to benzene and halothane for six weeks are recorded.

N82-24815# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

INHALATION STUDIES WITH BENZENE IN RATS. PART A: TOXICOLOGICAL DATA

L. M. Appelman, C. F. Kuper, and D. deRijke *In its Evaluation of Immunol. Methods for Toxicity Studies in Animals: Inhalation Studies with Benzene and Halothane in Rats* Mar. 1980 73 p refs

Avail: NTIS HC A07/MF A01

Subchronic benzene inhalation toxicity was studied by exposing groups of 15 male and 15 female rats to atmospheres containing 0, 25, 250 or 1250 ppm benzene, 6 hr a day, 5 days a week, for 13 weeks. Five males and five females of each group were killed after 6 weeks for interim pathological examination. Two groups of female rats were exposed to 0 or 250 ppm benzene for a period of 6 weeks. Examination shows that benzene concentrations of 1250 or 250 ppm in the atmosphere can induce lymphopenia accompanied by reduced thymus and spleen weights. The no-toxic-effect level of benzene in rats is 25 ppm. Author (ESA)

N82-24816# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

INHALATION STUDIES WITH BENZENE IN RATS. PART B: IMMUNOLOGICAL DATA

O. Brocades Zaalberg and J. L. F. Gerbrandy *In its Evaluation of Immunol. Methods for Toxicity Studies in Animals: Inhalation Studies with Benzene and Halothane in Rats* Mar. 1980 26 p refs

Avail: NTIS HC A07/MF A01

Subchronic benzene inhalation toxicity was studied. In experiments (1) and (2), male and female rats were exposed to 0, 25, 250, and 1250 ppm benzene vapor for 6 hr a day, 5 days a week for 13 weeks. In experiment (3), female rats were exposed to 250 ppm for 6 weeks. Primary antibody formation against sheep red blood cells (SRBC) in (1) varies too much to justify conclusions about a benzene effect. The antibody response to SRBC by the test rats in (3) is the same as that of the controls. Mitogen stimulation of spleen cells and peripheral blood cells shows a linear log benzene dose effect relation with phytohemagglutinin (PHA) stimulated male and female spleen cells in (1), and with PHA, Concanavalin A or PWM stimulated peripheral blood cells in (2). In (3), a significant reduction in PHA stimulation of peripheral blood cells from test rats is observed. Author (ESA)

N82-24817# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

INHALATION STUDIES WITH HALOTHANE IN FEMALE RATS. PART A: TOXICOLOGICAL DATA

L. M. Appelman and C. F. Kuper *In its Evaluation of Immunol. Methods for Toxicity Studies in Animals: Inhalation Studies with Benzene and Halothane in Rats* Mar. 1980 17 p refs

Avail: NTIS HC A07/MF A01

Halothane inhalation toxicity was studied by exposing female rats for 6 hr a day, 5 days a week to atmospheres containing 0 or 2500 ppm halothane, for 6 weeks. Mean concentration of the test compound in the atmosphere was 2506 ppm. Inhalation causes growth retardation lymphopenia and slight anemia. More urine of lower density and containing more ketones is produced. Lower glucose and higher urea nitrogen levels in the blood are observed. Higher serum alkaline phosphatase activity is noted. Higher relative liver and kidney weights and a lower relative spleen weight are recorded. Author (ESA)

N82-24818# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

INHALATION STUDY WITH HALOTHANE IN FEMALE RATS. PART B: IMMUNOLOGICAL DATA

O. Brocades Zaalberg and J. L. F. Gerbrandy *In its Evaluation of Immunol. Methods for Toxicity Studies in Animals: Inhalation Studies with Benzene and Halothane in Rats* Mar. 1980 10 p refs

Avail: NTIS HC A07/MF A01

The effect of exposure to halothane vapor on immunological parameters was studied by exposing female rats to 2500 ppm halothane a day, 5 days a week for 6 weeks. No effect on the primary antibody response to sheep erythrocytes is observed. The secondary antibody response to tetanus toxoid is slightly, but not significantly, lowered as is the delayed hypersensitivity reaction to tuberculin. The local antibody production to tetanus toxoid in the lung is not changed. The transformation reaction of peripheral blood lymphocytes with phytohemagglutinin or concanavalin A is slightly, but not significantly reduced. Author (ESA)

N82-24819# Joint Publications Research Service, Arlington, Va.

USSR REPORT. LIFE SCIENCES: EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 5

8 Apr. 1982 18 p refs Transl. into ENGLISH from various Russian articles

(JPRS-80525) Copyright. Avail: NTIS HC A02/MF A01

The biological effects of magnetic fields are reported. The cerebral cortex of rats was studied. Metabolic changes in rats are reported. Ion metabolism in blood and myocardium of rats and guinea pigs was also investigated.

N82-24820# Joint Publications Research Service, Arlington, Va.

PATHOMORPHOLOGICAL REACTIONS OF CEREBROCOR-TICAL NEURAL ELEMENTS TO ALTERNATING MAGNETIC FIELD

I. V. Toroptsev and L. P. Soldatova *In its USSR Rept. Life Sci.: Effects of Nonionizing Electromagnetic Radiation, No. 5* (JPRS-80525) 8 Apr. 1982 p 1-4 refs Transl. into ENGLISH from *Arkh. Patol. (Moscow)*, v. 43, No. 11, Nov. 1981 p 33-36

Copyright. Avail: NTIS HC A02/MF A01

The cerebral cortex was studied as a model highly sensitive to magnetic fields. Significant disturbances in the water-electrolyte balance, manifested as hydropic changes in the walls of cortical capillaries, nerve cells and their derivatives were discovered. A horseshoe electromagnet with trapezoidal tips at the poles was used to create an alternating magnetic field with a frequency of 50 Hz, which deviated by no more than 5 percent over the entire area of the magnet at a field intensity of 20 mT. The field gradient was 0.1 mT/cm. Intensity pulsation was 1.8 percent. One-time total exposures lasting 6.5 hours were employed. The experiments were run in winter on 136 male rats weighing 190-210 gm. The animals (three specimens in each experiment) were maintained unrestrained in a nonmagnetic cage which limited mobility somewhat. They were killed by decapitation after 1, 6, 12 and 24 hours and 3, 5, 7, 14, 21 and 28 days following exposure. Portions of the parietal, posterior frontal and limbic cortex were sampled as morphological equivalents of, correspondingly, the sensorimotor, kinesthetic and motor analyzers and the analyzer of the internal environment. Author

N82-24821# Joint Publications Research Service, Arlington, Va.

METABOLIC CHANGES IN EXPERIMENTAL ANIMALS AS INDICATORS OF BIOLOGICAL EFFECTS OF 50 Hz

ELECTROMAGNETIC FIELDS

L. A. Tomashevskaya and Yu. D. Dumanskiy *In its USSR Rept. Life Sci.: Effects of Nonionizing Electromagnetic Radiation*, No. 5 (JPRS-80525) 8 Apr. 1982 p 5-8 refs Transl. into ENGLISH from *Vrachebnoye Delo* (Kiev), no. 7, Jul. 1981 p 98-100

Copyright. Avail: NTIS HC A02/MF A01

The biological effects of commercial frequency (CF) electromagnetic fields (EMF) as a function of intensity and time of exposure to the field are discussed. Conditions proceeding from those that actually prevail in areas where high-voltage lines pass were simulated. A chronic experiment was conducted on white rats (180 specimens) divided into groups according to intensity (E-10, 15, 20 kV/m) and modes of exposure to CF EMF (4 and 16 times a day, 5 min per session, to a total of 20 and 80 min). Biochemical processes were evaluated according to different types of metabolism participating in the body's response to CF EMF. For this purpose, we assayed urea and residual nitrogen in blood serum, blood glucose, liver glycogen, adrenal ascorbic acid, cholinesterase activity, ceruloplasmin content and saturation with transferring iron of blood serum. Studies were conducted during exposure to the field for 4 months, as well as in the aftereffect period.

Author

N82-24822# Joint Publications Research Service, Arlington, Va.

EFFECTS OF EXPERIMENTAL STATIONARY MAGNETIC FIELD ON METABOLISM OF SOME IONS IN BLOOD AND MYOCARDIUM

D. D. Tvildiani, T. I. Chlaidze, N. V. Dolidze, L. N. Golashvili, and V. A. Chikhladze *In its USSR Rept. Life Sci.: Effects of Nonionizing Electromagnetic Radiation*, No. 5 (JPRS-80525) 8 Apr. 1982 p 8-11 refs Transl. into ENGLISH from *Soobshch. Akad. Nauk Gruz. SSR (USSR)*, v. 101, no. 1, Jan. 1981 p 169-172

Copyright. Avail: NTIS HC A02/MF A01

The effects of a stationary magnetic field (SMF) on EKG parameters and ion (Na, K, Ca, Mg) metabolism in blood serum and myocardial homogenate were studied. The study was conducted on 30 rabbits and 30 guinea pigs. Three-hour exposure of rabbits to SMF elicited a shift of the S-T segment on the EKG, depression of T wave, change in amplitudes of R and S waves in different directions, and after 24 and 48 h a drop of general voltage as well. Thirteen out of fifteen healthy rabbits expired on the 2nd or 3rd day after the last exposure to SMF. Conclusions are presented.

N.W.

N82-24823# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

TORSO EXPERIENCED AERODYNAMIC FORCES EXPERIENCED DURING EJECTION

Arthur J. Nestle Feb. 1981 48 p refs
(AD-A098942; AFAMRL-TR-80-20) Avail: NTIS HC A04/MF A01 CSCL 06/19

The forces are momentarily unique in direction and can be of severe magnitude. One difficulty of analyzing extremity injury during emergency escape is the diversity and intensity of the aerodynamic environment the human torso experiences entering free stream flow. Aerodynamically, an appreciation of these forces, which can be resolved into positive and negative pressure locally, can be achieved from correlation of the relative likeness of anatomical segments to investigated geometric shapes (i.e., spheres, cylinders, etc.). Aerodynamic data were obtained from tests using modelled crewmembers in a five foot wind tunnel and coefficients of pressure calculated from manometer readings. These coefficients were determined for crewmember location and pitch, and yaw of trim of the aircraft from -10 to +10 degrees each, and were graphically analyzed using three dimensional computer plots. Severity, gross kinetic changes, and points of force application are described.

T.M.

N82-24824# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

PROBLEMS IN THE THERAPY OF SOMAN POISONING

O. L. Wolhuis, F. Berends, and E. Meeter Apr. 1981 27 p refs
(Contract A79/K/032)

(MBL-1981-1; TDCK-75106) Avail: NTIS HC A03/MF A01

The lack of efficacy of combined therapies, involving a cholinolytic drug and an oxime, is reviewed. Problems include

rapid aging of the phosphorylated acetylcholinesterase, poor reactivation of nonaged inhibited enzymes (oxime resistancy), and the predominant effect of soman on the central nervous system. Species differences and the persistence of soman in depots complicate treatment. Reactivation of only a few percent of the total amount of functional cholinesterase can save life, so enzyme aging is not serious. Oxime resistance is overcome by oximes which effectively penetrate the blood brain barrier. These oximes also have antidotal effects not based on enzyme reactivation.

Author (ESA)

N82-24825# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Audiology Group.

EFFECTS OF IMPULSE NOISE ON HUMAN BEINGS: A PILOT STUDY ON ANNOYANCE RATINGS IN THE LABORATORY

G. F. Smoorenburg and W. H. deVries May 1981 53 p refs
(IZF-1981-9; TDCK-75523) Avail: NTIS HC A04/MF A01

Annoyance ratings for traffic, gunfire, pile driving and white noise were recorded by young male adults on a numerical scale. The noises were presented at 49, 56, 63, and 70 dbA for 5 min. Results show no significant differences in ratings for the noises, but when results are combined with those of other researchers, significant interaction between the effects of different levels and of different noises is found. At 63 dbA, ratings for traffic, gunfire and pile driving noise are about the same, but at 49 dbA gunfire and pile driving noise are rated more annoying than traffic noise. The white noise bursts are rated higher than gunfire and pile driving noise.

Author (ESA)

N82-24826# Washington Univ., Seattle. Dept. of Psychology.

INDIVIDUAL DIFFERENCES IN DUAL TASK PERFORMANCE Final Report, 1 Apr. 1977 - 31 Mar. 1980

Marcy Lansman and Earl Hunt 10 Jun. 1981 35 p refs
(Contract N00014-77-C-0225)
(AD-A110768) Avail: NTIS HC A03/MF A01 CSCL 05/10

The topic of the research was individual differences in dual task performance. It addressed the basic question: Is performance on multi-component tasks predicted by performance on the individual components performed separately? In the first series of experiments, we used a dual task involving memory and verbal processing components to predict a psychometric measure of verbal ability. Single and dual task performance were found to be highly correlated. The two types of measures predicted performance on the criterion verbal ability measure equally well.

GRA

N82-24827# Illinois Univ., Champaign. Cognitive Psychophysiology Lab.

THE EVENT RELATED BRAIN POTENTIAL AS AN INDEX OF INFORMATION PROCESSING, COGNITIVE ACTIVITY, AND SKILL ACQUISITION: A PROGRAM BASIC RESEARCH Annual Report

Emanuel Donchin and Christopher Wickens Nov. 1981 62 p refs

(Contract F49620-79-C-0233; AF Proj. 2313)
(AD-A111057; CPL81-1/AFO; SR81-1; AFOSR-82-0042TR)
Avail: NTIS HC A04/MF A01 CSCL 05/10

This report describes experiments and developments related to six basic categories of research on the event-related brain potential, performance, and cognition: (1) Tracking, attention, and workload; (2) automation, skill learning, memory, and the 'depth' of information processing; (3) individual differences; (4) mental chronometry; (5) other components of the ERP than P300; and (6) methodologies and analytical techniques.

GRA

N82-24828# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Traffic Behavior Group.

A RATIONALE FOR THE DEVELOPMENT OF CUT-OFF SCORES

I. H. Veling Feb. 1981 19 p refs
(IZF-1981-3; TDCK-75517) Avail: NTIS HC A02/MF A01

How many response errors a subject is allowed before being defined as a nonmaster is considered. A model which defines the probability that masters and nonmasters respond correctly to an item, and that an individual is a master of that item, is presented. Cut-off scores must be greater than or equal to the test score of the X percent point of the binomial distribution with parameters M and m sub j (j = 1, 2, ..., M), where X is a value close to zero, M is a set of bivalued items scored 1 whenever

an item is answered correctly and j is an item. The model correctly determines the cut-off score in a traffic knowledge test.

Author (ESA)

N82-24829# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Experimental Psychology Group.

STRESS, INFORMATION PROCESSING AND DIVING

P. G. A. M. Jorna Apr. 1981 27 p refs

(Contract A79/KM/030)

(IZF-1981-4; TDCK-75518) Avail: NTIS HC A03/MF A01

The influence of experience on diver performance was investigated. Divers selected target letters from a series auditorily presented with 2 second intervals. Additional selective counting of these letters was required. Test dives were made at three periods in a training course, and performance was compared with an experienced group. Performance improves with training. Information selection is not influenced by experience, but the use of this information is less optimal for inexperienced divers. Physiological measures (heart rate, 0.10 Hz component, respiration) show a decreased response to the environment as training progresses. Experienced divers show stable responses to being underwater.

Author (ESA)

N82-24830# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Experimental Psychology Group.

DISTRACTION IN VISUAL SEARCH

A. H. Wertheim Jun. 1981 17 p refs

(Contract A78/KL/081)

(IZF-1981-7; TDCK-75522) Avail: NTIS HC A02/MF A01

The search time lengthening effect of distractor stimuli in a visual search task, e.g., spotting ground targets from the air, was studied. Subjects sought target light spots on a screen with pseudorandomly distributed distractors. Six distracting stimuli within a field of 600 nontarget stimuli lengthen search time by 2.5 sec. When the number of distractor stimuli increases, this distraction effect changes into a search time shortening effect. Distraction is not related to the brightness or color qualities of nontarget stimuli. Distraction is affected by the foreground-background configuration of the visual field. This configuration depends on the expectancy of the observer with respect to the nature of the target.

Author (ESA)

N82-24831# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Vision Group.

RECOGNITION EXPERIMENTS WITH THERMAL IMAGES. PART 4: EFFECT OF SIGNAL TO NOISE RATIO

S. Mangouri and A. vanMeeteren Jun. 1981 14 p refs

(Contract A76/KL/080)

(IZF-1981-8; TDCK-75520) Avail: NTIS HC A02/MF A01

The effect of pictorial noise on the recognition of thermal images of military vehicles was studied. Thermographs were displayed indoors in a simulation, using a flying spot scanner with variable scan line density and variable amounts of noise added electronically in the scanning circuit. In each session, 69 pictures were presented in random order with the same scan line density and the same signal to noise ratio. Subjects were asked to identify the vehicles from 6 alternatives. Practically no effect is found for signal to noise ratios (per pixel, per 0.1 sec) higher than 20, while there is only moderate decay when the ratio is reduced to 5. This decay is approximately the same over the investigated range of scan line densities. Author (ESA)

N82-24832# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Experimental Psychology Group.

SEARCH TIMES IN TWO-DIMENSIONAL TABLES

W. A. Wagenaar and J. M. A. Fokkens Jul. 1981 8 p

(IZF-1981-10; TDCK-75524) Avail: NTIS HC A02/MF A01

The relation between search time in two-dimensional tables, e.g., timetables, and the number of rows/columns and alphabetical ordering was investigated. Subjects compared the table entry for a target with the digit typed beside the table. Results show that search time can be predicted from a weighted summation of the number of rows and columns. The weights are 230 msec for randomly ordered rows/columns, and 130 msec when rows or columns are alphabetized.

Author (ESA)

N82-24833# Purdue Univ., Lafayette, Ind. Dept. of Foods and Nutrition.

PLANT DIVERSITY TO SUPPORT HUMANS IN A CELSS GROUND BASED DEMONSTRATOR Final Report, 1 Jul. 1979 - 1 Oct. 1981

J. M. Howe and J. E. Hoff 1 Oct. 1981 49 p refs

(Grant NSG-2401)

(NASA-CR-168918; NAS 1.26:168918)

Avail: NTIS

HC A03/MF A01 CSCL 06K

A controlled ecological life support system (CELSS) for human habitation in preparation for future long duration space flights is considered. The success of such a system depends upon the feasibility of revitalization of food resources and the human nutritional needs which are to be met by these food resources. Edible higher plants are prime candidates for the photoautotrophic components of this system if nutritionally adequate diets can be derived from these plant sources to support humans. Human nutritional requirements information based on current knowledge are developed for inhabitants envisioned in the CELSS ground based demonstrator. Groups of plant products that can provide the nutrients are identified.

T.M.

N82-24834# Wisconsin Univ., Madison. Dept. of Horticulture.

CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM: USE OF HIGHER PLANTS

T. W. Tibbitts and D. K. Alford (Metropolitan State Coll.) May 1982 86 p refs Proc. of NASA Workshop held at Chicago, Nov. 1979 and at Moffett Field, Calif., Mar. 1980

(Grant NSG-2405)

(NASA-CP-2231; NAS 1.55:2231)

Avail: NTIS

HC A05/MF A01 CSCL 06K

Results of two workshops concerning the use of higher plants in Controlled Ecological Life Support Systems (CELSS) are summarized. Criteria for plant selection were identified from these categories: food production, nutrition, oxygen production and carbon dioxide utilization, water recycling, waste recycling, and other morphological and physiological considerations. Types of plant species suitable for use in CELSS, growing procedures, and research priorities were recommended. Also included are productivity values for selected plant species.

Author

N82-24835# Metrics, Inc., Atlanta, Ga.

CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM: RESEARCH AND DEVELOPMENT GUIDELINES

Robert M. Mason, ed. and John L. Carden, ed. (Georgia Inst. of Technology) May 1982 99 p refs Proceedings of NASA Workshop held at Moffett Field, Calif., 9-12, 1979

(Grant NSG-2323)

(NASA-CP-2232; NAS 1.55:2323)

Avail: NTIS

HC A05/MF A01 CSCL 06K

Results of a workshop designed to provide a base for initiating a program of research and development of controlled ecological life support systems (CELSS) are summarized. Included are an evaluation of a ground based manned demonstration as a milestone in CELSS development, and a discussion of development requirements for a successful ground based CELSS demonstration. Research recommendations are presented concerning the following topics: nutrition and food processing, food production, waste processing, systems engineering and modelling, and ecology-systems safety.

Author

N82-24836# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM - BIOLOGICAL PROBLEMS

Berrien Moore, III, ed. (New Hampshire Univ.) and R. D. MacElroy, ed. 1982 42 p refs

(NASA-CP-2233; A-8842; NAS 1.55:2233)

Avail: NTIS

HC A03/MF A01 CSCL 06K

The general processes and controls associated with two distinct experimental paradigms are examined. Specific areas for research related to biotic production (food production) and biotic decomposition (waste management) are explored. The workshop discussions were directed toward Elemental cycles and the biological factors that affect the transformations of nutrients into food, of food material into waste, and of waste into nutrients were discussed. To focus on biological issues, the discussion assumed that (1) food production would be by biological means (thus excluding chemical synthesis), (2) energy would not be a limiting factor, and (3) engineering capacity for composition and leak rate would be adequate.

B.W.

N82-24837# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

PREDICTING PILOT OPINION RATINGS OF FLYING QUALITIES OF HIGHLY CONTROL AUGMENTED AIRCRAFT

USING AN OPTIMAL PILOT MODEL M.S. Thesis

Randall M. Enright 8 Dec. 1981 172 p refs

(AD-A111136; AFIT/GAE/AA(80D-3)

Avail: NTIS

HC A08/MF A01 CSCL 05/8

A computer simulation was constructed using optimal control theory to model the human pilot. This optimal pilot model was used to evaluate highly control augmented aircraft and predict the human pilot opinion rating of its flying qualities. Eight aircraft/control system configurations were evaluated twice by the model using two different sets of initial conditions. The performance indices for each of the configurations were plotted and compared to a plot of the human pilot ratings of the same configurations. Variances were noted in the relative positioning of the performance ratings and the relative positioning of the pilot opinion ratings, and the mean difference in ratings between the performance index predictions and the pilot ratings varied with the initial conditions of the model (the initial conditions of the actual flight tests were unknown). The RMS error in the state response to system noise for each configuration was also plotted and compared to the pilot ratings. DOE

N82-24838# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

DRIVING EXPERIENCE AND TASK DEMANDS IN SIMULATOR AND INSTRUMENTED CAR: A VALIDATION STUDY Progress Report

G. J. Blaauw 1980 33 p refs

(IZF-1980-9; TDCK-75108; PR-2)

Avail: NTIS

HC A03/MF A01

The absolute and relative validity of a fixed base vehicle simulator during straight road driving were evaluated in terms of system performance and driver behavior. Inexperienced and experienced drivers performed lateral and longitudinal vehicle control in the simulator and in an instrumented car on the road. Each control was varied with a free and forced accuracy instruction resulting in four levels of task demand. Sequence effects between simulator and instrumented car, and training effects on each system, were studied. Overall results show a good absolute and relative validity for longitudinal vehicle control; lateral vehicle control shows good relative validity. Absolute validity is lacking in lateral control due to a worse perception of lateral translations (absence of kinesthetic feedback). Yaw rotations are perceived in the simulator quite well. The simulator discriminates between inexperienced and experienced drivers better than the instrumented car. Author (ESA)

N82-25751*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

STS-2 MEDICAL REPORT

Sam L. Pool, ed., Philip C. Johnson, Jr., ed., and John A. Mason, ed. May 1982 31 p refs

(NASA-TM-58245; S-514; NAS 1.15:58245)

Avail: NTIS

HC A03/MF A01 CSCL 06C

All medically related activities of the Space Transportation System 2 flight are described, ranging from preflight to post-flight. Several medical problems occurred during the flight. Their was marginal operation on-board potable water system caused by a malfunctioning fuel cell. Work and rest cycles by the crew were altered to maximize the scientific data acquisition. Inadequate time was allocated for food preparation and consumption. There was low water intake by the crew because of the water shortage. R.J.F.

N82-25752# Central Research Inst. for Physics, Budapest (Hungary). Central Research Inst. for Physics.

ELEMENTAL ANALYSIS OF SAMPLES OF BIOLOGICAL ORIGIN RELATIVE TO THEIR PROTEIN CONTENT BY MEANS OF CHARGED PARTICLE BOMBARDMENT

L. Szoekfalvi-Nagy, I. Demeter, L. Varga, K. Hollos-Nagy, and L. Keszthelyi Apr. 1981 26 p refs In ENGLISH; HUNGARIAN summary Submitted for publication

(KFKI-1981-26; ISSN-0368-5330; ISBN-963-371-803-1) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The particle excited X-ray emission (PIXE) and the ¹⁴N(d,p) ¹⁵N nuclear reaction was combined for simultaneous elemental composition and nitrogen content determination in biological samples. Using the correlation between nitrogen and protein content the elemental composition is related to the protein content of the sample. The principles and main characteristics of the method are described and illustrative applications are also given. DOE

N82-25753# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

THE EFFECTS OF SOME DRUGS ON THE SURVIVAL OF RATS IN VARIOUS STAGES OF HEMORRHAGIC SHOCK

M. Wijnans and P. vanEck Jun. 1981 30 p refs In DUTCH;

ENGLISH summary

(Contract A76/K/095)

(MBL-1981-7; TDCK-75204) Avail: NTIS HC A03/MF A01

Possible treatments of rats in hemorrhagic shock were studied in order to compare simple shock treatments techniques that can be applied by nonmedical personnel. Three procedures were followed in order to obtain three states of shock: (1) bleeding until a certain low blood pressure resulted, producing nearly 100% death of the rats (2) similar bleeding followed by reinfusion of the shed blood after a certain interval, resulting in nearly 100% survival, and (3) a Wiggers type of transfusion resistant shock, causing 80% mortality within 24 hr in spite of the reinfusion of all the shed blood. When the required state of shock was obtained, various treatments were immediately applied. The administration of a saline solution in the stomach following procedure (1) has little or no effect on the survival time, but when injected intraarterially it is very effective. Pharmacological agents (dramine, octapressine, dexamethasone, atropine) have either no effect or make the situation worse. Author (ESA)

N82-25754# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 16, NO. 2, MARCH - APRIL 1982

14 May 1982 152 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982

(JPRS-80822) Avail: NTIS HC A08/MF A01

Nutritional and dietic studies in space flight feeding are highlighted. Mineral content in space rations was studied with respect to prevention of ill effects due to hypokinesia. The diets of the crews of the Salyut Space Station were examined for nutritional benefits. Other topics covered include: bacterial activity in weightlessness; the concentration of amino acids in various muscles during prolonged space flight; the adaptivity of man to stressful conditions in the spacecraft cabin; and the functional stability of the cardiovascular and digestive systems during and after long duration space flight.

N82-25755# Joint Publications Research Service, Arlington, Va.

THIRD DECADE OF SPACE BIOLOGY

O. G. Gazenko and G. P. Parfenov In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 2, Mar.-Apr. 1982 p 1-10 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 4-10

Avail: NTIS HC A08/MF A01

The major results of experiments on microorganisms, plants and animals flown onboard space vehicles during the past two decades were reviewed. To explain the experimental findings, it is hypothesized that living beings develop an indirect adaptation to gravity effects which has a bearing only on the phylogenetic process. T.M.

N82-25756# Joint Publications Research Service, Arlington, Va.

DIET OF CREW IN SALYUT-6 ORBITAL STATION

V. P. Bychkov, A. S. Ushakov, S. Kalandarov, M. V. Markaryan, Ye. A. Sedova, A. K. Kivuk, and O. S. Khokhlova In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 2, Mar.-Apr. 1982 p 11-15 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 10-13

Avail: NTIS HC A08/MF A01

The nutrition factor in life support systems (LSS) for spacecraft crews consists of the food allowance and equipment to store foods, preparation and intake of food. The main purpose of this factor is to keep a level of vital functions in cosmonauts that would assure the successful implementation of flight programs. The distinctions of outfitting nutrition elements depend on both the duration of space missions and principles of construction of LSS as a whole. The space diets used in flight of five permanent Salyut-6 crews were reviewed. Cosmonauts complained that sterile canned foods became distasteful; due to this, a space diet

consisting of 65% freeze-dried foodstuffs was developed and tested. T.M.

N82-25757# Joint Publications Research Service, Arlington, Va.

EFFECT OF 48-DAY FLIGHT ON BLOOD AMINO ACID CONTENT IN THE CREW OF SALYUT-5

I. G. Popov and A. A. Latskevich *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 16-22 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 14-19

Avail: NTIS HC A08/MF A01

The study of the content of 17 amino acids in plasma of the crewmembers pre- and postflight demonstrated their time-course changes. This concerns mostly cystine and methionine. It is recommended to improve the cystine and methionine content of space diets and to modify technological procedure of food preservation. T.M.

N82-25758# Joint Publications Research Service, Arlington, Va.

STATE OF DIGESTIVE SYSTEM FOLLOWING LONG-TERM SPACE FLIGHTS

K. V. Smironov, G. D. Syrykh, V. I. Legenkov, L. G. Goland-Ruvina, I. L. Medkova, and L. I. Voronin *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 23-28 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 19-22

Avail: NTIS HC A08/MF A01

In the crewmembers of four Salyut-6 long-term flights, enzyme excretory function of the gastro-intestinal tract was investigated. These studies included: gastric proenzyme, pepsinogen, and pancreatic enzymes, amylase and lipase, in blood and urine, trypsin in blood, intestinal enzymes, invertase and glycyl-L-leucine dipeptidase in feces, and lipids in feces. The results obtained demonstrated a correlation between changes in enzyme excretion and space flight duration and profile. After the 140- and 175-day flight the most marked changes in the digestive organs were seen: they manifested as simultaneous increase in secretory function of the stomach and the pancreas. However, after the 185-day flight, in which advanced countermeasures were used, the above changes were less distinct. Author

N82-25759# Joint Publications Research Service, Arlington, Va.

BIOLOGICAL VALUE AND SHELF LIFE OF CULTURED DAIRY PRODUCTS IN THE DIET OF COSMONAUTS

I. A. Radayeva, G. A. Rossikhina, V. A. Usacheva, G. S. Poyarkova, and S. P. Shulkina *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 29-33 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 23-26

Avail: NTIS HC A08/MF A01

Freeze-dried culture milk products--yoghurt with sugar, yoghurt with fruits and berries, acidophilic paste--were examined in the course of storage. The optimal time of their storage was determined, and high biological value of protein and good viability of lactic acid microflora were demonstrated. These products were recommended to be incorporated into space diets. Author

N82-25760# Joint Publications Research Service, Arlington, Va.

EFFECT OF HYPOKINESIA ON MAN'S NUTRITIONAL STATUS

V. P. Bychkov, V. N. Gryaznova, S. Kalandarov, A. G. Kasatkina, V. A. Korshunova, M. V. Markaryan, A. K. Sivuk, and O. S. Khokhlova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 34-39 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 26-29

Avail: NTIS HC A08/MF A01

In three series of experiments of 120, 49 and 180 days in duration 36 test subjects were exposed to clinostatic and antiorthostatic hypokinesia. Human requirements for various nutrients were defined under hypokinetic conditions. It was demonstrated that during bed rest exercises together with adequate nutrition and after bed rest certain nutrients can serve as efficient countermeasures against metabolic changes. Author

N82-25761# Joint Publications Research Service, Arlington, Va.

CLINICOPHYSIOLOGICAL CHANGES IN MAN DURING LONG-TERM ANTIORTHOSTATIC HYPOKINESIA

T. N. Krupina, A. Ya. Tizul, M. P. Kuzmin, and N. I. Tsyganova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 40-45 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 29-34

Avail: NTIS HC A08/MF A01

Using clinical-physiological and biochemical methods, adaptation to prolonged (182 days) head-down tilting (-4.5°) was investigated. It was found that man exposed to hypokinesia for a month or longer, with countermeasures lacking, showed polymorphic clinical-physiological and biochemical disorders accompanied by a decline of his adaptive capabilities. This may aggravate further adaptation and readaptation processes. Author

N82-25762# Joint Publications Research Service, Arlington, Va.

EFFECTS OF 1 ALPHA-HYDROXYCHOLECALCIFEROL AND DIFFERENT AMOUNTS OF PHOSPHORUS IN FOOD ALLOWANCE ON SOME PARAMETERS OF PHOSPHORUS AND CALCIUM METABOLISM IN HYPOKINETIC RATS

N. V. Blazheyevich, V. B. Spirichev, A. S. Ushakov, M. S. Belakovskiy, A. L. Pozdnyakov, and I. N. Sergeyev *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 46-54 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 34-40

Avail: NTIS HC A08/MF A01

The exposure of rats to hypokinesia and a phosphorus-enriched diet (Ca:P = 1:3) was accompanied by hypocalcemia, hyperphosphatemia, calcium losses from bones and formation of calcifications in the kidneys. The decrease of the phosphorus content in the diet (Ca:P = 1:0.5-1:1) prevented these disorders. The administration of 1 OHD3 at a dose of 0.025 micrograms/day arrested hypokinesia-associated hypocalcemia and bone changes. The administration of 1 alpha OHD3 together with a high phosphorus consumption enhanced nephrolithiasis and induced aortal medial calcinosis in hypokinetic rats. These data indicate that phosphorus consumption should be reduced in order to prevent disorders in phosphorus-calcium metabolism during hypokinesia. They also suggest that administration of 1 alpha OHD3 may be hazardous in the case of excessive phosphorus consumption. Author

N82-25763# Joint Publications Research Service, Arlington, Va.

INFLUENCE OF LEVEL OF MINERALIZATION OF DESALINATED, HIGH QUALITY WATER OF THE HYDROCARBONATE CLASS ON FUNCTIONAL STATE OF MALE WHITE RAT GONADS

O. I. Balashov, A. B. Sysoyev, and A. V. Rodnikov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 55-61 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 40-45

Avail: NTIS HC A08/MF A01

As known, the salt content in the potable water has a gonadotropic effect, the level of which being in agreement with the traditional norm. However, within the normal limits one can distinguish better or worse functional manifestations. It is shown that statistical treatment of the data, using the Student t-test, is of low efficiency because it neglects the ratio between groups. Of greater efficiency is the statistical treatment based on the domineering order. Proceeding from the theoretical speculations and experimental results, potable water with the mineral content of 250 mg/lambda should be regarded as optimal. Author

N82-25764# Joint Publications Research Service, Arlington, Va.

SOME PHYSIOLOGICAL AND BIOCHEMICAL FEATURES OF CELLS OF CARROT GALL DEVELOPED IN WEIGHTLESSNESS

M. G. Tairbekov, L. A. Voronkov, and N. A. Guzlova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 62-67 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 45-48

Avail: NTIS HC A08/MF A01

The results of experiments with the carrot tissues infected with *Agrobacterium tumefaciens* flown onboard the biosatellite Cosmos-1129 are presented. Postflight, the respiratory activity of tumor cells was determined and $K(+)$ and $Na(+)$ permeability of cell membranes was measured. The resulting data give evidence that in weightlessness the development of the carrot gall tumor is accompanied by changes in the above physiological and biochemical parameters. The changes are, however, within the physiological limits, leading to no pathologies of the whole cell. T.M.

N82-25765# Joint Publications Research Service, Arlington, Va.

FUNCTIONAL STATE OF RAT GASTROINTESTINAL TRACT ORGANS FOLLOWING FLIGHT IN COSMOS-1129 BIOSATELLITE

K. V. Smirnov, L. G. Goland-Ruvina, N. P. Goncharova, O. V. Zhiznevskaya, I. L. Medkova, N. M. Nikolayeva, R. A. Pechenkina, and A. N. Petrusenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 62-73 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 68-73

Avail: NTIS HC A08/MF A01

The enzyme-excretory and motor functions of the gastrointestinal tract of rats flown for 18.5 days onboard the biosatellite Cosmos-1129 were studied. Immediately postflight, the pepsin synthesis decreased and the dipeptide parietal hydrolysis increased. At R+6, the activity of the enzymes responsible for the cavitary and parietal hydrolysis of lipids significantly grew and that of the enzymes involved in protein hydrolysis fell. At R+30, the carbohydrate hydrolysis was inhibited and the activity of lipolytic enzymes enhanced markedly. The amplitude and rhythm of stomach biopotentials were disbalanced. The so-called immobilization stress of intact rats brought about activation of lipase, monoglyceridyl lipase, monoglyceridyl lipase, dipeptidase and inhibition of amylase and invertase. The immobilization exposure of flight rats caused inhibition of the membrane hydrolysis of proteins and carbohydrates and lack of the pancreatic reaction. Author

N82-25766# Joint Publications Research Service, Arlington, Va.

AMINO ACIDS OF FEMORAL QUADRICEPS OF RATS FOLLOWING FLIGHT ABOARD THE COSMOS-936 BIOSATELLITE

T. F. Vlasova, Ye. B. Miroshnikova, V. V. Polyakov, and T. P. Murugova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 74-78 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 53-56

Avail: NTIS HC A08/MF A01

The amino acid composition of the muscle of rats flown onboard the biosatellite and exposed to the ground-based synchronous control experiment was studied. The weightless rats showed changes in the amino acid concentration in the quadriceps muscle. The centrifuged flight and synchronous rats displayed an accumulation of free amino acids in the above muscle. T.M.

N82-25767# Joint Publications Research Service, Arlington, Va.

PLASMA AND TISSUE LIPIDS OF RATS FOLLOWING FLIGHT ABOARD COSMOS-936 BIOSATELLITE

J. Ahlers, R. A. Tigranyan, and M. Praslicka *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 79-82 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 56-58

Avail: NTIS HC A08/MF A01

The content of triglycerides, total phospholipids and nonesterified fatty acids was measured in plasma and tissues of rats flown for 18.5 days on Cosmos-936 in the weightless and centrifuged state. The weightlessness exposure increased lipid fractions in plasma and tissues, and artificial gravity produced a beneficial effect. Author

N82-25768# Joint Publications Research Service, Arlington, Va.

PLASMA AND TISSUE LIPIDS OF RATS FOLLOWING

FLIGHT ABOARD THE COSMOS-1129 BIOSATELLITE

J. Ahlers, R. A. Tigranyan, I. Djatelinka, B. Schmeida, M. Toropila, and M. Praslicka *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 83-86 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 58-61

Avail: NTIS HC A08/MF A01

Concentrations of triglycerides, total cholesterol, lipid phosphorus and nonesterified fatty acids were measured in blood plasma, liver, thymus, bone marrow and adipose tissues of rats flown for 18.5 days onboard the biosatellite Cosmos-1129. This exposure was accompanied by increases in lipomobilization, content of total cholesterol and lipid phosphorus in plasma, and triglycerides in the thymus and bone marrow. The postflight exposure to repeated stresses demonstrated changes in the lipid content in all animal groups, especially in flight rats. Author

N82-25769# Joint Publications Research Service, Arlington, Va.

MINERAL PHASE AND PROTEIN MATRIX OF RAT OSSEOUS TISSUE FOLLOWING FLIGHT ABOARD THE COSMOS-1129 BIOSATELLITE

A. A. Prokhonchukov, K. S. Kesyatnichenko, R. A. Tigranyan, and N. A. Komisarova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 87-92 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 61-64

Avail: NTIS HC A08/MF A01

The major parameters of the mineral component and protein matrix of bones were investigated in 30 rats flown onboard Cosmos-1129. Postflight, the content of calcium decreased by 7.8%, that of phosphorus diminished by 11.8%, the Ca/P ratio increased by 5.9%, the content of collagen diminished by 14.7% and that of non-collagenous proteins by 45.7% and the content of sialic and hexuronic acids increased by 36.2% and 14.6%, respectively, as compared to the vivarium control. The role of EDTA- and HCl-protein extracts, soluble and poorly soluble calcium fractions, protein-Ca-phosphate complex, sialic and hexuronic acids in the mechanism of calcium binding by the bone organic matrix are discussed. Author

N82-25770# Joint Publications Research Service, Arlington, Va.

NEUROPHYSIOLOGICAL CHARACTERISTICS OF SENSORIMOTOR CORTEX OF RATS SUBMITTED TO EARLY MOTOR DEPRIVATION AND CONDITIONING

I. A. Shimko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 93-101 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 64-70

Avail: NTIS HC A08/MF A01

Young rats, beginning with the age of 1 month, were kept in small size cages for 3 months, i.e., were exposed to 3-month motor deprivation. This exposure caused a modulating effect of a diminished activity of neuronal populations in the sensorimotor cortex which manifested as a prolongation of the latent periods of primary responses and recovery cycles of excitation of the neuronal populations generating the responses. The differences in the opposite changes in the sensorimotor cortex of the young animals that developed following prolonged deprivation and training of similar duration were seen in the parameters of excitation recovery cycles rather than in the latent periods. Both early motor deprivation and training did not influence the heterochronic development, emergence and subsequent attainment of the maximum amplitude of components of the testing primary response in the process of a gradual increase of the stimulus-to-stimulus interval. Author

N82-25773# Joint Publications Research Service, Arlington, Va.

MAN'S ADAPTIVE REACTIONS TO ACOUSTIC PARAMETERS OF ISOLATED HABITATS

G. A. Manovtsev, V. A. Korsakov, G. I. Odinkov, and V. A. Stepanov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 113-120 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 76-81

Avail: NTIS HC A08/MF A01

Noise plays an important part in the set of factors that characterize man's distinctive living conditions in pressurized chambers. The study of acceptability of noise levels, subjective evaluation of the acoustic environment by the test subjects, and examination of their cardiovascular function demonstrated the development of adaptive reactions to the noise effects which were accompanied by a certain tension in the cardiovascular system. Author

N82-25774# Joint Publications Research Service, Arlington, Va.

AGE-RELATED DISTINCTIONS OF ECHOCARDIOGRAPHIC PARAMETERS OF HEALTHY MAN

A. M. Babin *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 121-124 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 82-84

Avail: NTIS HC A08/MF A01

Certain parameters of intracardiac hemodynamics and myocardial contractility of healthy men were examined by echocardiography. Age-related variations of these parameters were seen in representatives of different age groups. It is emphasized that echocardiography may find a wider application in space medicine. Author

N82-25775# Joint Publications Research Service, Arlington, Va.

ROLE OF POLARIZATION AND RESONANCE IN ASSESSING THE BIOLOGICAL EFFECTS OF ELECTROMAGNETIC RADIATION

A. A. Galkin *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 125-130 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 84-87

Avail: NTIS HC A08/MF A01

The dosimetric concept of measurements of electromagnetic radiations (EMR) during irradiation of biological objects can be realized by methods of mathematical modeling of EMR interactions with biological objects, which can be represented as an image of the human body as a uniform ellipsoid of revolution. The efficient surface of EMR absorption for the models shows a marked resonance dependence on the radiation frequency. The ratio of the largest to the smallest axes of the ellipsoid of revolution can be used as resonance criterion. Besides, radiation polarization needs to be taken into consideration. The frequency dependence of the efficient absorption surface for three major types of radiation polarization is discussed. An applicability of the calculation method to the evaluation of the EMR absorbed dose rate is demonstrated. Author

N82-25776# Joint Publications Research Service, Arlington, Va.

SYMPATHOADRENAL SYSTEM OF COSMONAUTS FOLLOWING 7-DAY FLIGHTS

N. A. Davydova and R. A. Tigranyan *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 131-136 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 88-91

Avail: NTIS HC A08/MF A01

The sympathoadrenal system (SAS) is an important element of neurohumoral regulation, and for this reason it is particularly important to study the activity of its hormonal and mediatory elements, which is an indicator of stress reactions, during space flights when the human body is exposed to extreme factors, and the success of the flight depends largely on man's capacity to adjust to these conditions. A number of researchers examined SAS activity in cosmonauts following flights of various duration (1-4); however, the results do not reflect adequately the changes occurring in the SAS due to the fact that only some aspects of catecholamine (CA) metabolism were studied. Our objective here was to determine whether a stress reaction could occur following 7-day space flights by using the complete spectrum of parameters characterizing SAS activity. Author

N82-25777# Joint Publications Research Service, Arlington, Va.

VENOUS PRESSURE AS AN INDICATOR OF CIRCULATING BLOOD VOLUME

A. S. Nekhayev, V. A. Degtyarev, and V. S. Bednenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 137-140 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 91-92

Avail: NTIS HC A08/MF A01

The reduction in circulating blood volume (CBV) due to fluid loss in weightlessness can be viewed as one of the defense mechanisms that prevents development of hypertension and hypervolemia in the intrathoracic and cranial parts of the circulatory system. However, upon returning to Earth's gravity, this change in CBV could be the cause of decline in orthostatic stability of cosmonauts. For this reason, it is necessary to monitor CBV dynamics in the postflight period, particularly with correction of fluid-electrolyte balance. The possibility of indirect evaluation of CBV, in particular, by means of the indicator of venous pressure in the system of jugular veins measured indirectly is explored. Author

N82-25778# Joint Publications Research Service, Arlington, Va.

ELECTROMETRIC CHARACTERISTICS OF MAN'S GASTROLINGUAL REFLEX

I. Ya. Yakovleva *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 2, Mar.-Apr. 1982 p 125-130 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosmicheskaya Med.* (Moscow), v. 16, no. 2, Mar.-Apr. 1982 p 92-93

Avail: NTIS HC A08/MF A01

Results revealed that exposure of healthy man to conditions simulating the period of acute adaptation to weightlessness is associated with impaired function of the taste organ and is characterized by a change in the gastrolingual reflex electrometry of the taste analyzer was used to characterize man's gastrolingual reflex in the presence of usual gravity and with alteration of Earth's gravity. L.F.M.

N82-25779*# SRI International Corp., Menlo Park, Calif.

PURKINJE IMAGE EYETRACKING: A MARKET SURVEY Final Contractor Report

Lo. F. Christy Mar. 1979 144 p refs (Contract NAS2-9846)

(NASA-CR-166338; NAS 1.26:166338) Avail: NTIS HC A07/MF A01 CSCL 20F

The Purkinje image eyetracking system was analyzed to determine the marketability of the system. The eyetracking system is a synthesis of two separate instruments, the optometer that measures the refractive power of the eye and the dual Purkinje image eyetracker that measures the direction of the visual axis. E.A.K.

N82-25780# California Univ., Irvine, Dayton, Ohio.

TOXIC HAZARDS RESEARCH UNIT Annual Technical Report, Jun. 1980 - May 1981

J. D. MacEwen and E. H. Vernot Wright-Patterson AFB, Ohio AMRL Dec. 1981 139 p refs (Contract F33615-80-C-0512; AF Proj. 6302; MF58524025) (AD-A110587; AFAMRL-TR-81-126) Avail: NTIS HC A07/MF A01 CSCL 06/20

Chronic toxicity or oncogenic studies were carried out with methylcyclohexane, purified 1,1-dimethylhydrazine, Otto Fuel II, JP-10, RJ-5, and JP-4. A subchronic inhalation study was conducted with shale derived JP-5 and Decalin fuels. Acute toxicity studies were conducted on a variety of chemical agents used by the Air Force and Navy. GRA

N82-25781# Lund Univ. (Sweden). Radiofysika Inst.

IN VIVO X-RAY FLUORESCENCE ANALYSIS FOR MEDICAL DIAGNOSIS. A NON-INVASIVE METHOD FOR QUANTITATIVE DETERMINATION OF KIDNEY FUNCTION AFTER RADIOGRAPHIC EXAMINATIONS WITH IODINATED CONTRAST MEDIA Ph.D. Thesis

Thomas Groenberg May 1981 128 p refs (LUNFD6/NFRA-1013/1-21/(1981);

LUMEDW/MERI-1013/1-21/(1981)) Avail: NTIS (US Sales Only) HC A07/MF A01; DOE Depository Libraries

A Monte Carlo code was constructed and used to simulate the energy distribution of scattered photons obtained in various in vivo X-ray fluorescence measurements. The structure of this distribution was investigated and discussed. Studies of the response function of the Ge-detector used made it possible to

convert the calculated scatter spectra to pulse height distributions. These studies are valuable tools in designing in vivo X-ray fluorescence measurements. In vivo X-ray fluorescence measurements were used for quantitative non invasive measurements of the concentration of iodine containing contrast media in rabbits without the use of blood or urine sampling. The biological half life of the contrast medium in the soft tissue part of the nose (measured in vivo) was similar to that in serum (measured in vitro) when determined in the period 2 to 4 hours after injection. The method can be used for clinical evaluation of kidney function. DOE

N82-25782# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands)

SURVEY OF THE EXPERIMENTAL SHOCK RESEARCH PERFORMED AT THE MEDICAL BIOLOGICAL LABORATORY TNO AND AT THE PHARMACOLOGICAL LABORATORY, UNIVERSITY OF AMSTERDAM

C. vanderMeer Aug. 1981 19 p refs In DUTCH; ENGLISH summary Sponsored in cooperation with Amsterdam Univ. (Contract A76/K/095)

(MBL-1981-9; TDCK-75515) Avail: NTIS HC A02/MF A01

Experimental research on shock is surveyed. This research is urgently needed since the optimal treatment of shock patients is still a matter of discussion, while the occurrence of irreversible shock is still a serious problem. The research is partly aimed at a study of shock models, concerning different aspects of irreversible shock, i.e., tourniquet shock, hemorrhagic shock, endotoxin shock and intestinal ischemia shock. A model of shock kidney is studied as well as possibilities of emergency treatment to prevent the occurrence of shock and some aspects of diver's disease. The evaluation of certain forms of shock treatment is being initiated. Author (ESA)

N82-25783# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Audiologie.

THE EFFECT OF NOISE-INDUCED HEARING LOSS ON THE ABILITY TO UNDERSTAND SPEECH

J. A. P. M. deLaat and G. F. Smoorenburg Jul. 1981 17 p refs In DUTCH; ENGLISH summary (Contract A76/K/105)

(IZF-1981-11; TDCK-75525) Avail: NTIS HC A02/MF A01

Speech reception thresholds (50% sentence intelligibility) were measured for 22 persons (44 ears) with noise induced hearing loss (NIHL) and for 7 persons with normal hearing. The speech reception thresholds were measured in quiet and also in ambient noise at levels of 25, 40, 55, and 70 dBa. In ambient noise, an average speech reception threshold for the NIHL group was about 4 db higher than the average threshold for normals. The 4 db increase of signal to noise ratio required to keep the sentence score at 50% for the NIHL group can also be expressed in a loss of sentence score when the sentences are presented at the same signal to noise ratio to normals and NIHL group. For a signal to noise ratio at which normals just score 100%, the score for the NIHL group is only 33%. The hearing loss criterion of 25 db averaged across the losses at 500, 1000 and 2000 Hz implies a severe handicap to understand speech, in particular in noisy environments. In view of this handicap, hearing loss in excess of 15 db averaged across 1000, 2000 and 3000 Hz can not be tolerated. Author (ESA)

N82-25784# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Audiologie.

RECOMMENDATIONS TO AVOID HEARING DAMAGE DURING FIRING OF THE M198, FH70, M71 AND FH77 TOWED HORWITZERS

A. M. Mimpfen and G. F. Smoorenburg Jul. 1981 22 p In DUTCH; ENGLISH summary (Contract A79/KL/086)

(IZF-1981-13; TDCK-75526) Avail: NTIS HC A02/MF A01

Peak sound pressure levels were measured at several distances around the muzzles of four types of towed howitzers fired with different charges. For small charges, peak levels were determined also at the ear of the gunner and the other crew positions. The effective duration of each sound impulse was determined. On the basis of peak level and duration, the preferred number and the maximum number of firings not to be exceeded were calculated for three kinds of hearing protection in order to limit the risk of a hearing loss of 15 db or more averaged across 1.2 and 3 kHz to 5% (preferred value) or 10% (maximum). For some howitzers the A-weighted impulse level was measured

and can be used to estimate annoyance from firing noise.

Author (ESA)

N82-25785# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Audiologie.

STATISTICAL EXAMINATION OF HEARING LOSS DUE TO GUNFIRE NOISE AND INDUSTRIAL NOISE: CONSEQUENCES FOR SCREENING AUDIOMETRY WITH FIXED FREQUENCIES

J. A. P. M. deLaat and G. F. Smoorenburg Sep. 1981 22 p refs In DUTCH; ENGLISH summary (Contract A78/K/095)

(IZF-1981-20; TDCK-75531) Avail: NTIS HC A02/MF A01

The reliability of screening audiometry with fixed frequencies as compared to screening audiometry with a continuously sweeping frequency was investigated. The investigation was based on two data sets: 528 audiograms of 278 persons exposed to gunfire noise and 1306 audiograms of 679 persons exposed to industrial noise. Looking for gunfire noise dips of 30 db or greater at any frequency, the highest score is obtained with a screening frequency of 6300 Hz and a screening level of 25 db. The best choice for gunfire noise dips is 5000 Hz and 6300 Hz. For dips due to industrial noise, the best single screening frequency is 4000 Hz. For two screening frequencies the best choice is 4000 and 8000 Hz. The data sets show that two to four screening frequencies are sufficient and that screening levels should be chosen 5 to 10 db below the target level. Author (ESA)

N82-25786# Naval Training Equipment Center, Orlando, Fla. **PERFORMANCE MEASUREMENT AND NAVY'S TACTICAL AIRCREW TRAINING SYSTEM Final Technical Report, Mar. - Apr. 1981**

Gerald R. Stoffer Sep. 1981 39 p refs (AD-A110669; NAVTRAEQUIPC-IH-333) Avail: NTIS HC A03/MF A01 CSCL 05/9

The development and use of the Tactical Aircrew Training System (TACTS) as a means for training advanced air combat skills are described. Pilot performance measurement capabilities of the TACTS are reviewed in terms of their value for pilot selection, aircrew training, assessment, and simulator design. Several approaches and methods used to conceptualize and measure air combat maneuvering (ACM) performance are presented. Limitations in existing TACTS performance measurement capabilities are illustrated in terms of several psychometric, training, and TACTS operational user feasibility requirements for a system of performance measurement. It is concluded that while the existing TACTS represents a highly advanced aviation engineering technology that can provide extremely valuable training, that same technology has largely ignored the functional requirements for a system of human performance measurement. Improvements in the TACTS performance measurement capabilities will improve its training value even further. Author (GRA)

N82-25787# Duke Univ., Durham, N. C. School of Business Administration.

CONTINGENT DECISION BEHAVIOR: A REVIEW AND DISCUSSION OF ISSUES

John W. Payne Feb. 1982 61 p refs (Contract N00014-80-C-0114; NR Proj. 197-063) (AD-A111655; ONR-82-1) Avail: NTIS HC A04/MF A01 CSCL 05/10

A question of great concern in decision research is the extent to which the strategies used by an individual in making a judgment or choice are invariant across task environments. This paper reviews research showing that information processing in decision making, as in other areas of cognition, is highly contingent upon the demands of the task. Theoretical frameworks for handling task and context effect are explored: (1) Cost/benefit principles; (2) Perceptual processes; and (3) Adaptive production systems. Both the cost/benefit and perceptual frameworks are shown to have strong empirical support. Both frameworks, however, also have unresolved conceptual problems that are discussed. The adaptive production system framework has less direct support, but has the desirable property that it contains elements of both of the other frameworks. The question of how the different theoretical frameworks might be integrated is explored. Author (GRA)

N82-25788# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

RECOGNITION EXPERIMENTS WITH THERMAL IMAGES.

PART 2: EFFECT OF RASTER FREQUENCY In DUTCH; ENGLISH summary

A. vanMeeteren and J. M. Schipper 1980 21 p refs
(Contract A76/KL/080)
(IZF-1980-14; TDCK-75109) Avail: NTIS HC A02/MF A01

The effect of raster frequency in recognition experiments with thermal images was investigated. Experiments, determining the recognition chance as a function of scan line density, are described. For raster scanned images, the raster frequency is the dominant image quality factor. The modulation transfer functions of sampling aperture and display spot are of minor significance with regard to recognition of relevant objects in practical situations. The probability of recognition of a set of thermal pictures was measured psychophysically as a function of the raster frequency. When averaged over 6 objects in different orientations and with different degrees of warming up, the critical raster frequency required for 70% correct identification turned out to be 1.7 lines per meter on the target. However, this critical raster frequency differs considerably for different objects as well as for different appearances of the same object. It makes no sense to normalize the critical raster frequency relative to object dimensions. The prediction of the useful range of actual thermal imaging devices is outlined, starting from experimental data.

Author (ESA)

N82-25789# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Visuologie.

RECOGNITION EXPERIMENTS WITH THERMAL IMAGES. PART 3: EFFECT OF CONTRAST RENDITION

W. J. H. Meijer and A. vanMeeteren Apr. 1981 24 p refs
In DUTCH; ENGLISH summary
(Contract A76/KL/080)

(IZF-1981-5; TDCK-75519) Avail: NTIS HC A02/MF A01

The adjustment of contrast and luminance of displays for thermal imaging devices is discussed, with reference to adapting the dynamic range of the display to the dynamic range of the signals. Two questions are discussed with regard to this adaptation: the recognizability of thermal images affected if the dynamic range of the display is not fully utilized and advantages in displaying part of the signal range, e.g., colder regions or warmer regions, with enhanced contrast. Experiments demonstrate the best strategy utilizes both the signal and the display dynamics as completely as possible.

Author (ESA)

N82-25790# Admiralty Marine Technology Establishment, Teddington (England).

APU MAN-COMPUTER STUDIES GROUP SEMINAR PROCEEDINGS 1

R. Gregory HMSO Jun. 1980 50 p refs Proceedings held at Teddington, England, Feb. - Apr. 1980
(AMTE(E)-TM-80109; BR76709) Avail: NTIS HC A03/MF A01

Seminars held to explore the potential of computers as intelligent assisting devices in training and operational contexts are summarized. A cybernetic framework is proposed for understanding computer assisted instruction. Subject matter representation and knowledge representation schemes are presented.

N82-25791# Admiralty Marine Technology Establishment, Teddington (England).

THREE COMPUTER ROLES IN A CYBERNETIC LEARNING SYSTEM

In its APU Man-Computer Studies Group Seminar Proc. 1 Jun. 1980 p 7-17 refs

Avail: NTIS HC A03/MF A01

The importance of subject matter or knowledge representation in computer assisted instruction CAI is discussed. The components of such a learning system are identified as the learner, subject matter representation, subject matter expert, and the tutor. Within this framework, three roles that a computer can play in a learning system are discussed. The location of the system tutor, the component which mediates the learning process, is shown to be directly related to the sensitivity of the computer to the learner. A pre-CAI system where the computer is used as a simulator, a conventional CAI system, and an intelligent CAI system where the computer contains the tutor are outlined.

Author (ESA)

N82-25792# Admiralty Marine Technology Establishment, Teddington (England).

THE REPRESENTATION OF KNOWLEDGE: GOLDSTEIN'S GENETIC GRAPH

In its APU Man-Computer Studies Group Seminar Proc. 1 Jun. 1980 p 19-31 refs

Avail: NTIS HC A03/MF A01

The genetic graph is a computer based data structure that holds a knowledge representation, i.e., part of a program combining the technology of artificial intelligence with computer aided instruction (CAI). The structure emphasizes the representation of the evolution of expertise from the perspective of the learner with respect to intelligent CAI. An epistemology is established as the connective structure of the graph. The links between nodes themselves represent learning processes, such as generalization, analogy and refinement. As a result, the genetic graph allows a powerful modelling facility, i.e., the coaching system is more sensitized to development of the learner's expertise, this being achieved by the graph's capacity to yield information about the learner's knowledge state, his learning style and his route through the syllabus.

Author (ESA)

N82-25793# Admiralty Marine Technology Establishment, Teddington (England).

THE REPRESENTATION OF KNOWLEDGE: PASK'S L SUB P

In its APU Man-Computer Studies Group Seminar Proc. 1 Jun. 1980 p 33-46 refs

Avail: NTIS HC A03/MF A01

A general introduction to the proto language L sub p for the representation of conversations between intelligent entities is given. The main concepts and operations that constitute L sub p are explained including derivation, coherency and organizational closure, rule of Genoa and analogy, pruning, saturation, condensation, and analogy and isomorphic inference. The computer implementation of L sub p THOUGHTSTICKER is treated. It is used to represent the knowledge held by one or more persons concerning any conversational domain. Knowledge is represented as topics at nodes of a mesh which may be linked by derivational, analogical, or both types of connectivity.

Author (ESA)

N82-25794# Naval Submarine Medical Research Lab., Groton, Conn.

COLD WEATHER GOGGLES. 1: OPTICAL EVALUATION Interim Report

S. M. Luria, David F. Neri, Jo Ann S. Kinney, and Helen M. Paulson 19 Jan. 1982 34 p refs
(M0095PN001)

(AD-A111333; NSMRL-970) Avail: NTIS HC A03/MF A01 CSCL 06/17

To compare the utility of a dozen protective goggles for the cold, their transmittance of harmful radiation, optical quality, resistance to fogging, and comfort were measured. The transmittances were discussed in terms of thresholds for damage to the eye from various bands of light radiation. The optical characteristics were evaluated against military specifications for aviators' visors. All the goggles except one screened out enough UV at sea level, and all but two screened out enough of the visible and infrared radiation. There were wide variations in optical quality, resistance to fogging, and comfort. A set of specifications was drawn up to meet the various requirements, but it was concluded that one set of goggles was unlikely to be satisfactory for the wide range of conditions which would be encountered.

Author (GRA)

N82-25795# Navy Personnel Research and Development Center, San Diego, Calif.

OPERATOR PERFORMANCE ON TWO OFFICE DATA ENTRY SYSTEM TESTBEDS: PRELIMINARY ANALYSES Special Report, 1978 - 1979

Eleanor R. N. Robinson, John S. Malone, and Richard W. Obermayer Feb. 1982 28 p refs

(AD-A111535; NPRDC-SR-82-16) Avail: NTIS HC A03/MF A01 CSCL 05/8

This effort tested the effectiveness of two computerized data entry systems designed to improve operator efficiency and reduce the number of errors in Navy personnel records. Data were collected on operator performance times and the quantities of errors made using (1) a stand-alone system; and (2) a dis-

tributed data entry system that used an off-site computer in tandem with an on-site microprocessor. Preliminary analyses of data obtained were conducted to assess user acceptance so that modifications, if needed, could be implemented before the system was installed. Results showed that the distributed office data entry system provided a distinct advantage over the self-contained system in reducing errors in the information system without adding to the office workload. Also, using this distributed system to make changes resulted in a 75 percent time savings over the manual method. The time saved in making changes would be, by itself, a significant factor in evaluating the cost effectiveness of systems employing computer data bases. Author (GRA)

N82-25796# Clarkson Coll. of Technology, Potsdam, N.Y.
ANALYSIS OF THE POLARIZATION DEPENDENCE OF THE INTERACTION BETWEEN HUMAN FRAME TARGETS AND RADIO FREQUENCY SENSOR FIELDS Final Report, 8 May 1979 - 16 Apr. 1981

Harold R. Raemer Griffiss AFB, N.Y. RADC Nov. 1981 293 p refs
 (Contract F30602-78-C-0102; AF Proj. DNAR)
 (AD-A111590; RADC-TR-81-244) Avail: NTIS
 HC A13/MF A01 CSCL 17/9

An analytical model of a class of RF intrusion sensor systems was constructed. The constituents of the model are: a slotted coaxial cable laid circularly on the ground, an electromagnetic scatterer intended to simulate a human frame target in the vicinity of the cable and an antenna near the center of the circular configuration. Using the concept of a general electromagnetic field as a superposition of plane-wave fields ('plane-wave spectral representation of fields'), calculations were made of: (a) the fields from the cable slots as if the cable were in free space; (b) the effect of ground reflections on the fields were from the slots; (c) the fields of the waves scattered from the human frame target directly toward the antenna in response to the incident wave fields (a) plus (b); and (d) the effect of ground reflections on the scattered wave fields. These calculations were programmed for the VAX computer and some numerical results are presented for various orientations and positions of the human frame target. Author (GRA)

N82-25797# Army Research Inst. of Environmental Medicine, Natick, Mass.

AUXILIARY COOLING: COMPARISON OF AIR-COOLED VERSUS WATER COOLED VESTS IN HOT-DRY AND HOT-WET ENVIRONMENTS

Yair Shapiro, Kent B. Pandolf, Michael N. Sawka, Michael M. Toner, Fred R. Winsmann, and Ralph F. Goldman 27 Oct. 1981 21 p refs

(DA Proj. 3E1-62777-A-878)
 (AD-A110554; USARIEM-M-4/82) Avail: NTIS
 HC A02/MF A01 CSCL 06/17

Water-cooled, air-cooled and ambient air ventilated auxiliary cooling vests were evaluated in a hot-wet climate (HW) (35 C, 75% rh) and a hot-dry environment (HD) with additional infrared radiation ($T_{sub a} = 49$ C, 20% rh, 68 C black globe temperature). Twelve subjects dressed in full chemical warfare combat uniforms underwent 120 min of heat exposure in each combination of climate and cooling vest except for the hot-dry environment and ambient-air vest. During each exposure, total exercise time was 20 min and rest time 100 min. This resulted in a mean time weighted metabolic rate of 180 W. No significant differences were found between the air or the water-cooled vests in either the HD or HW climates. It was concluded that an air-cooled vest can be used with the same efficiency as a water-cooled vest. In contrast, the ambient-air vest was shown to have a low effectiveness in HW and to be dangerous in a HD climate. GRA

N82-25798# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Technische Menskunde.

VISUAL ERGONOMICS IN CARTOGRAPHIC AND LITHOGRAPHIC WORK AT THE TOPOGRAPHIC SERVICE. PART 2: REQUIREMENTS AND RECOMMENDATION FOR WORK STATIONS

E. Ellens and H. J. Leebeek Jul. 1981 29 p In DUTCH; ENGLISH summary

(Contract A76/KL/001)
 (IZF-1981-14-Pt-2; TDCK-75527-Pt-2) Avail: NTIS
 HC A03/MF A01

Advice about the ergonomics of map engravers work is given. As the different aspects of the advice are very much interwoven, a complete review concerning all the different ergonomic issues is given. The most important aspects are the worktable, sitting, the engraving task itself, working attitudes and general and local lighting. The requirements of each of these points are quite exacting because of the high performance demands of the task. Much attention was paid to the development of a new worktable, specially designed for this type of work. Author (ESA)

N82-25799# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afd. Visuologie.

INQUIRY OF FIELD EXPERIENCE WITH CAPS FOR THE ROYAL DUTCH ARMY

W. A. Lotens Oct. 1981 12 p ref In DUTCH; ENGLISH summary

(Contract A79/KL/111)
 (IZF-1981-21; TDCK-75532) Avail: NTIS HC 02/MF A01

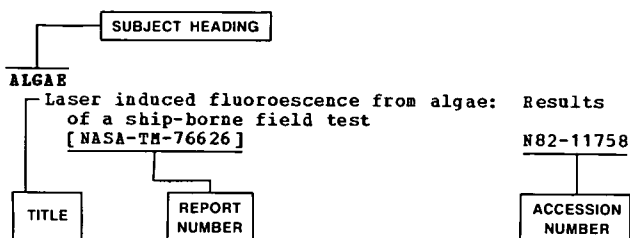
During a field trial, an emergency gas mask was worn by military personnel of eight different armed units and services, developed for the Royal Dutch Army. The average total wearing time was 19.3 hr and the average longest uninterrupted period was 2.4 hr. complaints, due to breathing impairment and design of the cap were reported. In comparison with the gas mask, however, the cap causes considerably less strain. The cap can be usable in its present shape, however improvements are recommended for breathing impairment compatibility with eyeglasses and optical instruments, leakage at the skin, and the stain of charcoal dust. Author (ESA)

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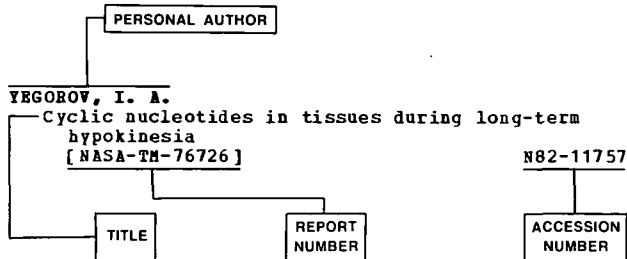
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